ST. LOUIS DISTRICT CULTURAL RESOURCE MANAGEMENT REPORT NUMBER 4

Archeological Investigations along the Lower Illinois River Floodplain: Cultural Resource Surveys of the Hartwell and Nutwood Levee and Drainage Districts, Jersey and Greene Counties, Illinois

Contract Nos. DACW43-82-Q-0633 and DACW-43-80-M-2326

by
Harold Hassen and James M. Batura
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Center for American Archeology

US Army Corps of Engineers
St. Louis District

JULY 1983

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO. / 3. RECIPIENT'S CATALOG NUMBER
4. TITLE *(and Subtitle)* ARCHEOLOGICAL INVESTIGATIONS ALONG THE LOWER ILLINOIS RIVER FLOODPLAIN: CULTURAL RESOURCE SURVEYS OF THE HARTWELL AND NUTWOOD LEVEE AND DRAINAGE DISTRICTS, JERSEY AND GREENE COUNTIES, ILLINOIS	5. TYPE OF REPORT & PERIOD COVERED
	6. PERFORMING ORG. REPORT NUMBER: SLD CRM REPORT 4
7. AUTHOR(s): Harold Hassen and James M. Batura	8. CONTRACT OR GRANT NUMBER(s): DACW-43-82-Q-0633, DACW-43-80-M-2326
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Center for American Archeology, P.O. Box 20, Kampsville, IL 62053	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS: U.S. ARMY ENGINEER DISTRICT, ST. LOUIS, 1222 SPRUCE STREET, ST. LOUIS, MISSOURI 63103-2833	12. REPORT DATE: July 1983
	13. NUMBER OF PAGES: 202
14. MONITORING AGENCY NAME & ADDRESS *(if different from Controlling Office)*: N/A	15. SECURITY CLASS. *(of this report)*: unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT *(of this Report)*

Approved for release; distribution unlimited

17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

18. SUPPLEMENTARY NOTES

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

The Contract Archeology Program, Center for American Archeology, under contract with the U.S. Army Corps of Engineers, St. Louis District, conducted two cultural resource surveys within the Hartwell and Nutwood Levee and Drainage Districts, Greene and Jersey Counties, Illinois. The purpose was to locate prehistoric and early historic archeological sites within a 45 meter wide corridor along the interior edge of the artificial levees. Field techniques included pedestrian walkover and shovel testing. Although the

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survey areas are very similar, environmental differences exist between the two districts. These differences include the development of natural levees, landform elevations, floodplain width and early historic vegetation. Twenty-three prehistoric archeological sites were identified. Nineteen sites are within the Hartwell District and four are in the Nutwood District. The distribution and description of collected assemblages are discussed. The potential effect of proposed levee improvements upon the archeological sites is evaluated and recommendations are presented.

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The Contract Archeology Program, Center for American Archeology, conducted two cultural resource surveys within the Hartwell and Nutwood Levee and Drainage Districts, Greene and Jersey Counties, Illinois. The purpose was to locate prehistoric and early historic archeological sites within a 45 meter wide corridor along the interior edge of the artificial levees. Field techniques included pedestrian walkover and shovel testing. Although the survey areas are very similar, environmental differences exist between the two districts. These differences include the development of natural levees, landform elevations, floodplain width and early historic vegetation. Twenty-three prehistoric archeological sites were identified. Nineteen sites are within the Hartwell District and four are in the Nutwood District. The distribution and description of collected assemblages are discussed. The potential effect of proposed levee improvements upon the archeological sites is evaluated and recommendations are presented.

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ACKNOWLEDGEMENTS

This project would not have reached completion without assistance from a number of individuals. The cooperation from the farmers and landowners whose fields were surveyed is greatly appreciated. Terry Norris, Army Corps of Engineers, St. Louis District, provided technical assistance and support. His continued interest in lower Illinois Valley prehistory is appreciated. Michael Wiant graciously contributed to hours of discussions regarding the prehistory and geology of the Illinois River Valley, including valuable information on the projectile point assemblages from the Koster and Napoleon Hollow sites. The interpretations presented below are a direct result of his participation. Edwin Hajic provided valuable assistance regarding questions on geologic context and overall Holocene floodplain evolution. Kenneth Farnsworth provided thoughtful insights on Illinois Valley projectile point typology and culture history. His assistance in compiling the early survey records for the sandridges is particularly appreciated. The assistance provided by David Morgan regarding ceramic identification and interpretation is appreciated. C. Russell Stafford and Kenneth Farnsworth commented on the initial draft for the report and their comments are appreciated. Charles J. Bareis and the Illinois Archaeological Survey provided site information for the survey area. Frieda Odell-Vereecken illustrated all the figures. Kenneth Farnsworth photographed the artifacts. Mary Youngblood typed the manuscript. The assistance provided by Marilyn J. Bender is particularly appreciated. Lucie L. Morgan and Liz Banghart helped prepare the final manuscript.

CHAPTER 1

Introduction

In 1980, the Army Corps of Engineers, St. Louis District, contracted with the Contract Archeology Program, Center for American Archeology to conduct a series of cultural resource surveys and Holocene geomorphological studies along the lower Illinois River valley floodplain. These projects were initiated as part of a comprehensive flood control study conducted by the Army Corps of Engineers.

This report will present the results of two cultural resource surveys conducted at the Hartwell Levee and Drainage District and the Nutwood Levee and Drainage District (Fig. 1). In anticipation of possible height and width expansion of the river channel levees and the recovery of borrow and subsequent creation of interior impound basins, the Army Corps of Engineers requested intensive surface surveys to determine archeological site locations and preliminary archeological resource evaluations.

Field examination of sites identified during Hartwell and Nutwood district surveys suggests that several sites have been partially disturbed during the original levee construction. It is anticipated that the information presented in this report will assist the Army Corps of Engineers in planning the protection of archeological resources during maintenance and development of the river shoreline and tributary streams levees.

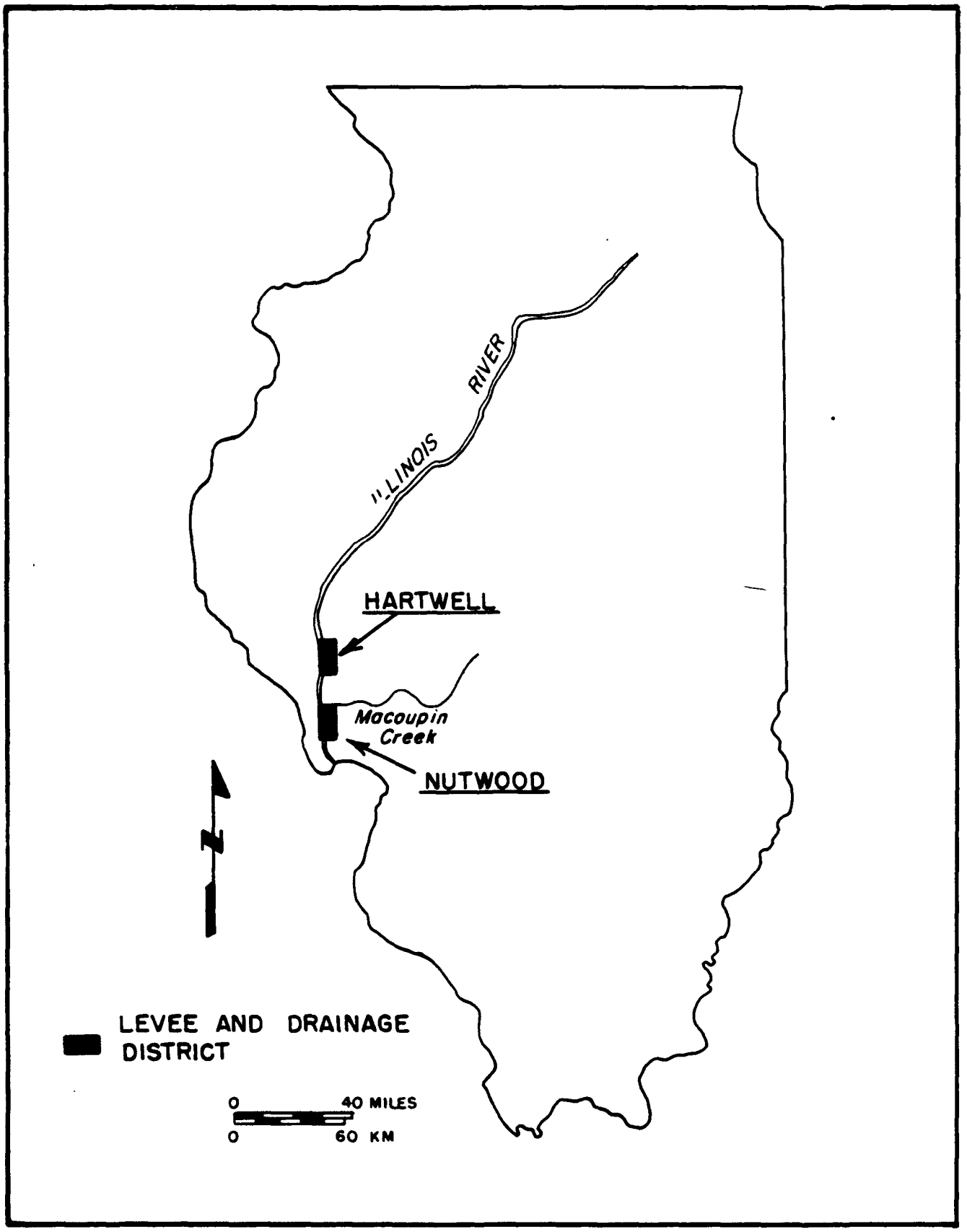


Figure 1. Hartwell and Nutwood Levee and Drainage Districts, Jersey and Greene Counties, Illinois.

Results from the surveys will also be an invaluable addition to ongoing research established by the Center for American Archeology. Since 1958, the Center for American Archeology has focused lower Illinois River drainage research around two primary goals: 1) the compilation of a master inventory for prehistoric and early historic aboriginal sites, and 2) to describe and explain changes through time in prehistoric settlement patterns and subsistence strategies.

The Hartwell Levee and Drainage District is situated in Greene County between Illinois River Miles 38 and 43.1 (Figure 2). The survey area consisted of 222 ha. The Nutwood Levee and Drainage District, located in Greene and Jersey Counties, is situated between Illinois River Miles 15 and 23.5 (Figure 3). The survey area in the Nutwood District is approximately 152 ha. The two districts are separated by the Keach and Eldred-Spankey Levee and Drainage Districts, approximately 24 kilometers in length.

Specifically, the survey was designed to provide the following:

1) locate and map surface prehistoric and early historic habitation and mortuary sites
2) collect culturally diagnostic material and/or retouched or modified artifacts.
3) provide descriptions of collected assemblages
4) provide recommendations regarding future archeological investigations within the survey areas.

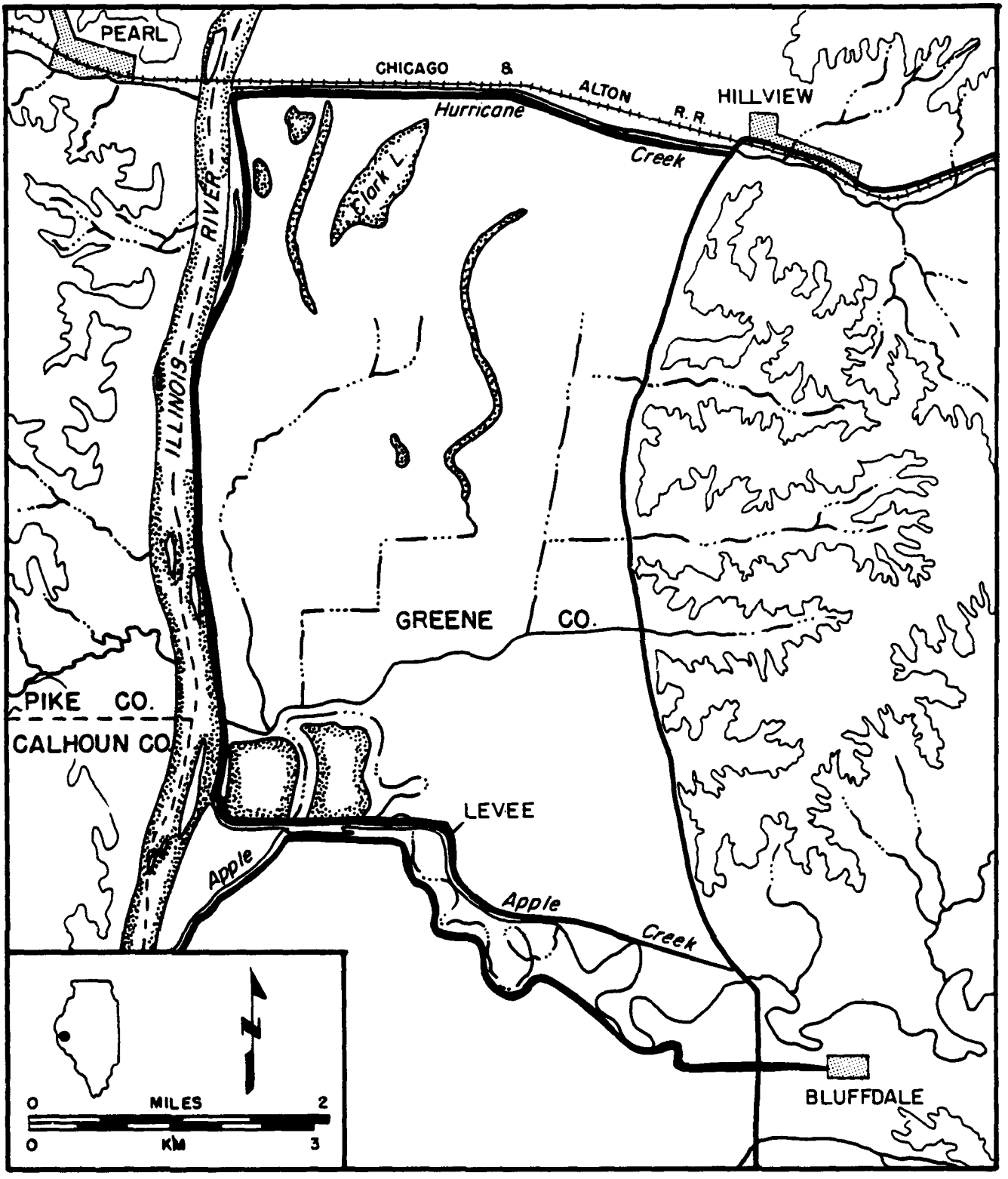


Figure 2. The Hartwell Levee and Drainage District, bounded by Hurricane and Apple Creek.

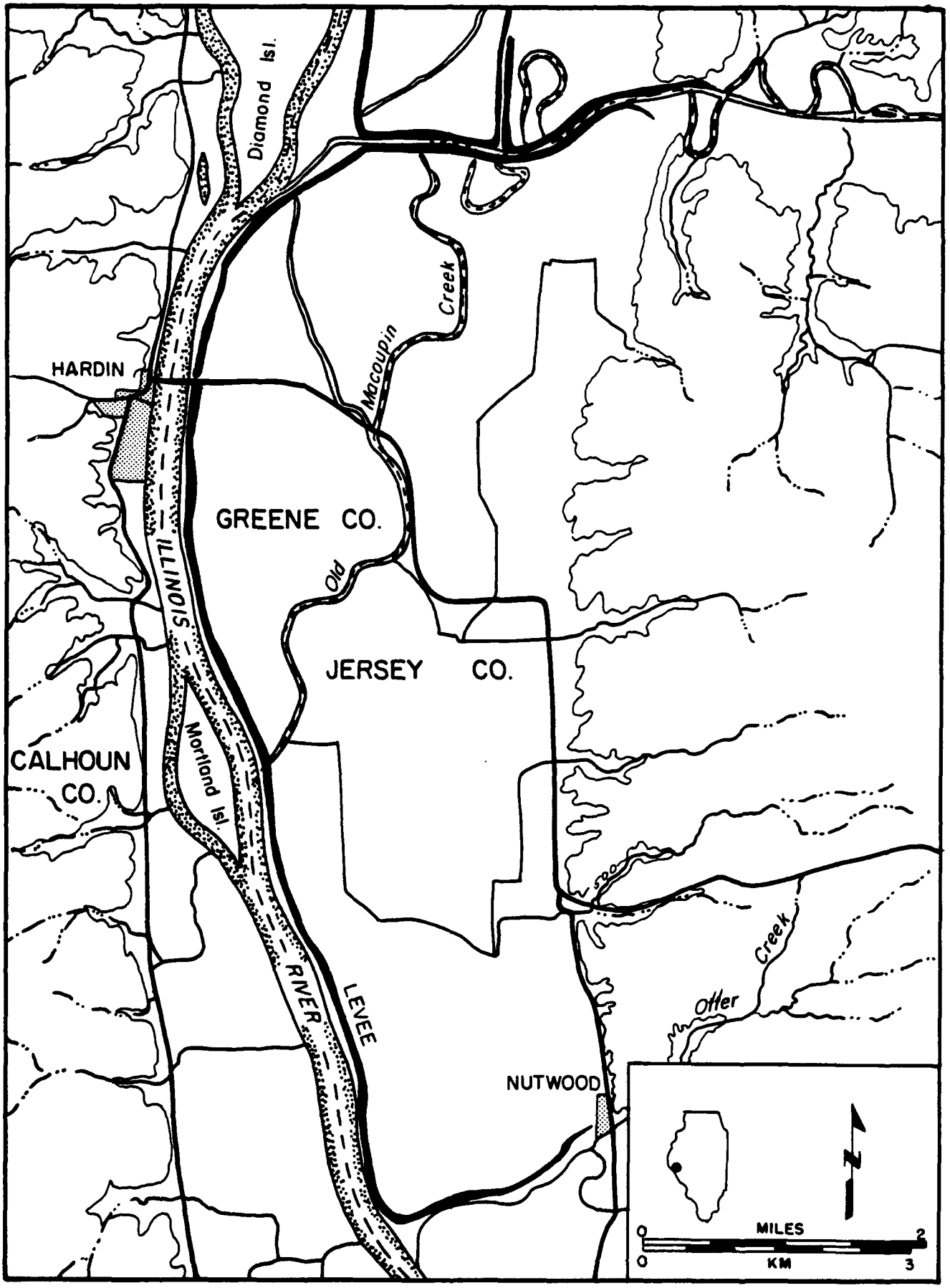


Figure 3. The Nutwood Levee and Drainage Drainage District, bounded by Macoupin and Otter Creeks.

This report is primarily descriptive. However, general interpretations and their implications for future archeological investigations are provided.

The surface survey began in July, 1980, and continued until October when field and weather conditions prohibited additional fieldwork. When pedestrian surveying was halted, significant portions of both levee districts had not been surveyed. These remaining areas had standing crops that greatly obscured ground surface visibility. Consequently, the survey was completed between April and June, 1981, after harvesting.

The survey was conducted within a 45 meter wide corridor along the interior edge of the levees. Twenty-three prehistoric archeological sites were identified. Nineteen sites are in the Hartwell District with the remaining four sites in the Nutwood District. Ten sites were already known from previous surveys.

The field survey and analysis was conducted under the direction of Dr. Harold Hassen. Field supervisor was Raymond Perkins with assistance from Sharon Kerber. Laboratory processing including washing and curation were coordinated by Marilyn J. Bender, laboratory director. Artifact analysis was conducted by James Batura with assistance provided by Harold Hassen, Marilyn J. Bender and David Morgan. David Asch and Nancy Asch provided a vegetation summary including the reconstruction of the early historic vegetation.

All materials and records from the survey are filed and curated in the arecheologial repository and Contract Program Office at Kampsville.

CHAPTER 2

Physical Setting

Both the Hartwell and Nutwood Levee Districts are situated within the eastern floodplain of the Illinois River. To the east are the bluffbase talus slopes and vertical bluffs. The Hartwell District is a broad, relatively uniform (almost five kilometers wide) floodplain. The northern and southern boundaries are formed by channelized Hurricane and Apple Creeks respectively. The Nutwood District is equaly wide in the northern section but becomes increasingly narrower toward the south (approximately three kilometers wide). The modern channel for Macoupin Creek is to the north and the southern border is marked by the modern Otter Creek.

Physiography

The Hartwell and Nutwood Levee Districts fall within the boundaries of two adjacent yet quite diverse physiographic areas. The Springfield Plain, Tills Plain Section of the Central Lowland Province is one of four areas within the Tills Plain Section largely composed of Illinoian Drift. These areas have only locally prominent glacial topography and differ from each other principally in the nature of their preglaciated surfaces. This area can be contrasted to the Lincoln Hills Section of the Ozark Plateau Province. While this province is prominent in Missouri it also extends into restricted areas of Illinois along the Mississippi River. The Lincoln Hills Section can be characterized as being deeply dissected and

composed of relatively flat-lying rocks (Willman et al. 1975: 17-19).

The Illinois River, which forms the western boundaries of both Greene and Jersey Counties, also corresponds to the boundary of these two provinces along much of the length of Greene County. At a point in the extreme southwestern portion of that county, approximately 3.1 km north of the town of East Hardin, the Lincoln Hills Section extends itself across the river and into the eastern floodplain of the Illinois River. Approximately the southwestern quarter of Jersey County is included in this section. The Hartwell District is located adjacent to the Springfield Plain while the Nutwood District is divided between that area and the Lincoln Hills Section (Willman et al. 1975).

Geomorphology

The geomorphology and shallow subsurface geology for both the Hartwell and Nutwood Levee Districts have been the subject of an extensive study funded by the Corps of Engineers, St. Louis District, and reported by Hajic (1981a,b). Because these reports present detailed descriptions, only a brief summary extracted from Hajic (1981a,b) is presented here.

Nutwood Levee District (Figure 4 and Figure 5)

Within the Nutwood District, the floodplain stands at approximately 127.7 meters (419 feet) elevation. A minimum elevation of 126.5 meters (415 feet) is recorded in an old basin of McFain Lake. Before the floodplain was artificially

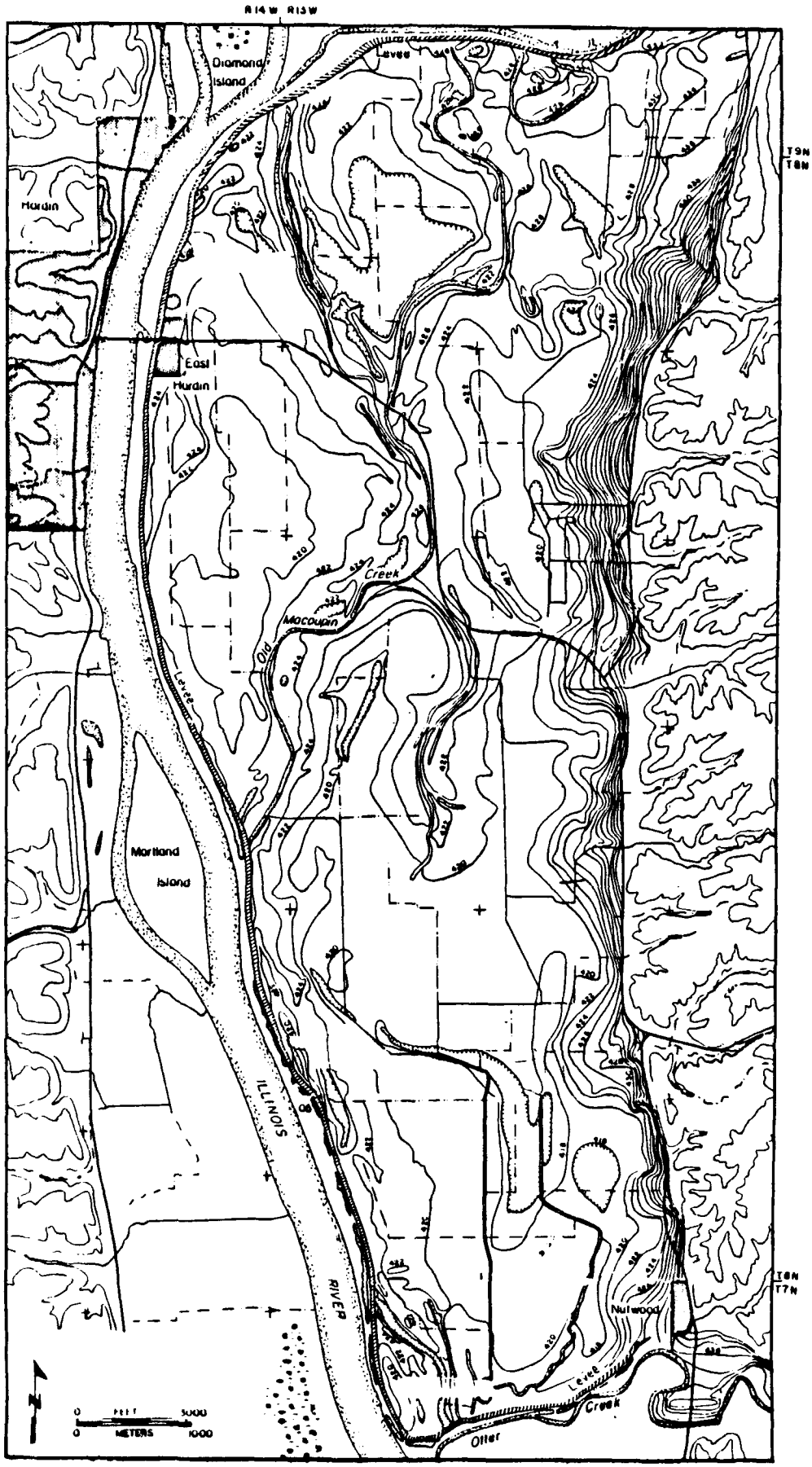


Figure 4. Topographic map, Nutwood District.
(Hajic 1981, After U.S. War Department 1944)

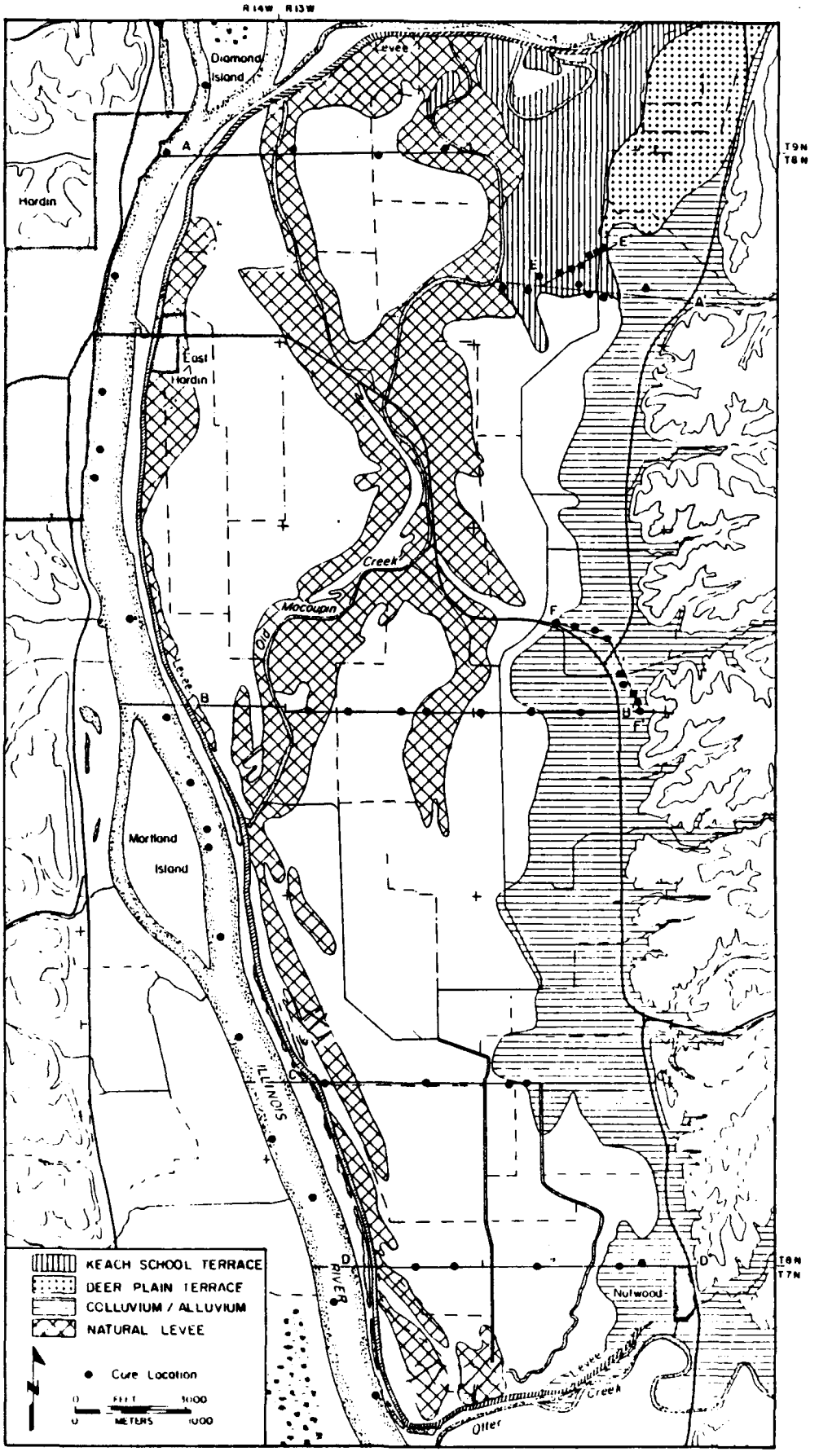


Figure 5. Geomorphic Landforms, Nutwood District. (Hajic 1981a).

drained to improve farmland numerous backwater lakes and swamps were present.

Natural levees rise 1.2 - 2.4 meters (4 - 8 feet) to a maximum 130.1 meters (426.8 feet) elevation. Bordering old Macoupin Creek are natural levees and a crevasse splay. The natural levees bordering the Illinois River channel have been truncated by floodplain drainage and flood scour. This has resulted in a series of discontinuous natural levees.

Both the Keach School Terrace, at 130.8 meters (429 feet) and the Deer Plain Terrace at 132.9 meters (436 feet) are exposed in the northeast section of the district. Tributaries entering the eastern floodplain are distinguished by coalescing alluvial and colluvial fans.

Hartwell Levee District (Figure 6 and Figure 7)

Situated upriver from the Nutwood District the floodplain within the Hartwell District stands approximately 128.6 meters (422 Feet) in elevation. A minimum elevation of 127.7 meters (419 feet) is recorded at Garrison Hollow.

The old bed for Long Lake bisects the floodplain along a north-south axis, two-thirds the length of the district. Long Lake represents a former creek channel occupying an old broad Illinois River channel. Natural levees along this channel reach 129.8 meters (426 feet) in elevation.

Natural levees along the present channel for the Illinois

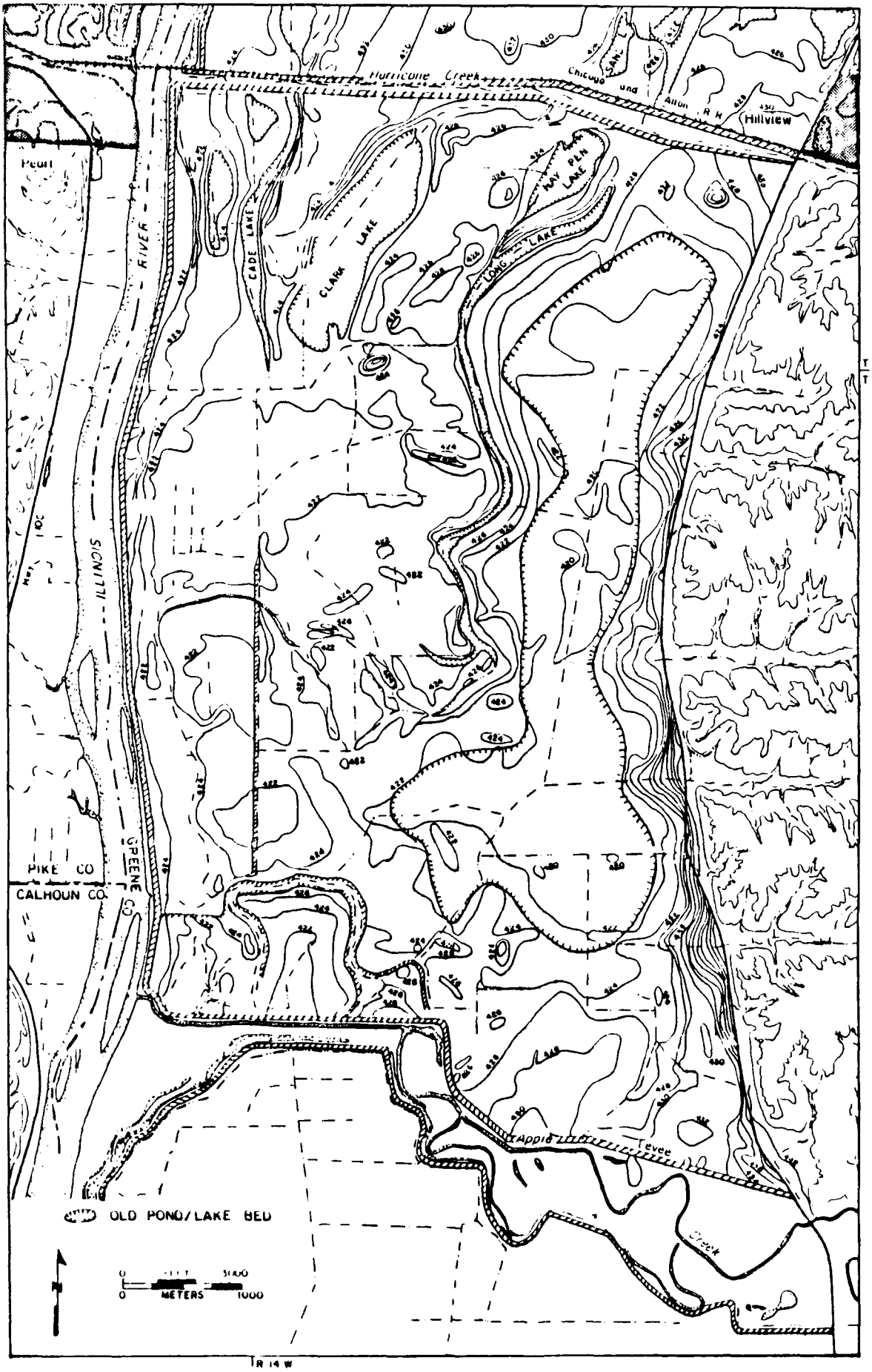


Figure 6. Topographic map, Hartwell District.
(Hajic 1981b, After U.S. War Department 1944)

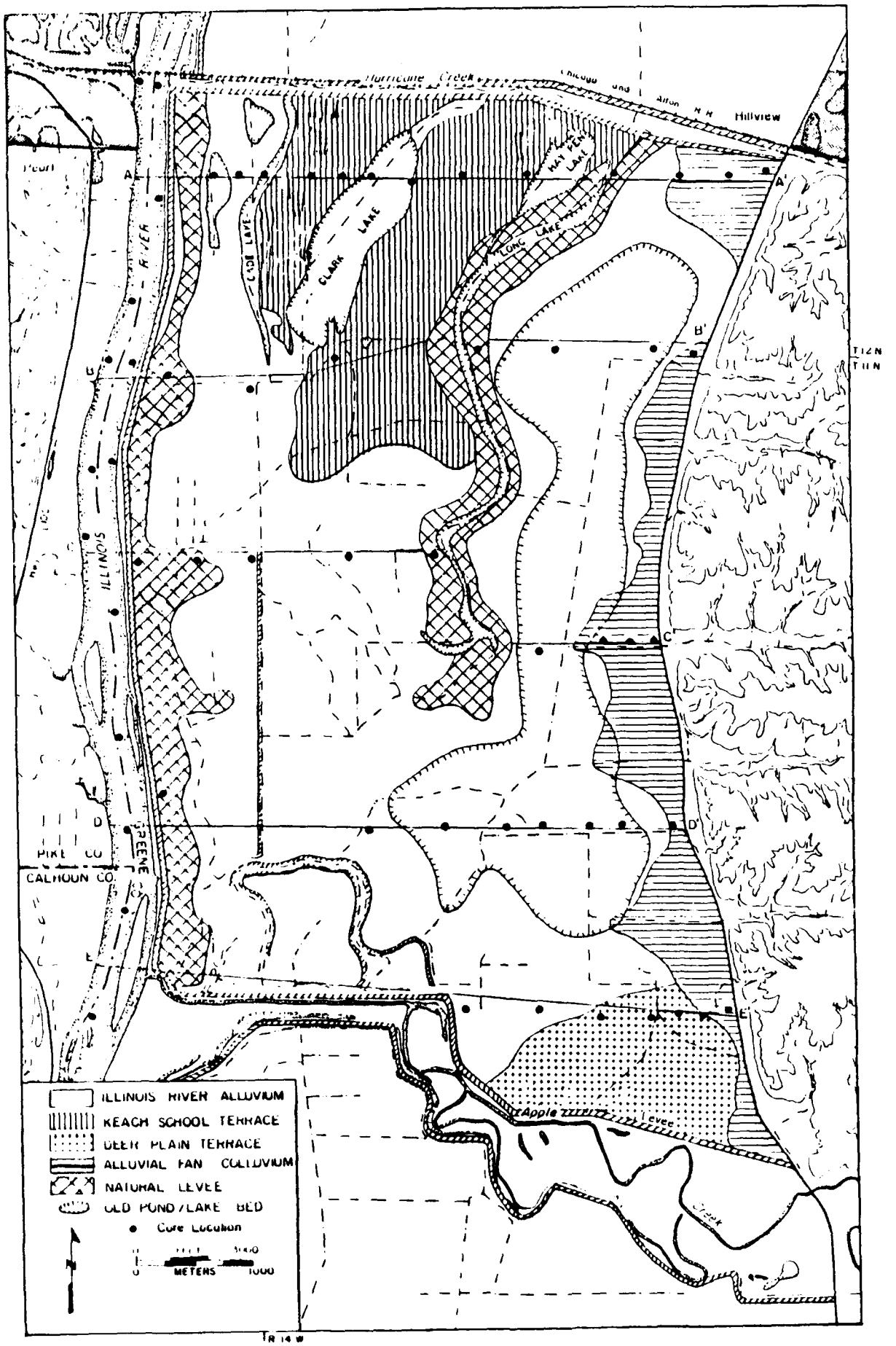


Figure 7. Geomorphic Landform, Hartwell District. (Hajic 1981b).

River are discontinuous and rise to 131.1 meters with an average of 129.8 meters.

In the northwest section of the district is a remnant of the Keach School Terrace. This terrace rises to a maximum elevation of 131.7 meters (432 feet). Between the old beds of Clark and Long Lake an eroded section of the Keach School Terrace has been identified. This surface has a maximum elevation of 130.5 meters (428 feet). North of the embouchure of Apple Creek the Deer Plain Terrace remnant reaches a maximum elevation of 131.7 meters (432 feet). An as yet unidentified elevated area of unknown origin is located west of the Deer Plain Terrace and next to channelized Apple Creek.

Similar to the Nutwood District the floodplain previously contained backwater lakes and swamps. However, in contrast to the Nutwood District the bluffbase alluvial fans are not coalescent, but appear individually. These alluvial fans are also smaller.

Vegetation*

The present vegetation of the Illinois River Valley is greatly altered from that of presettlement times. The construction of levees and drainage ditches has made it possible to cultivate most of the floodplain and has led, consequently, to elimination of most of the native prairies and backwater lakes.

U.S. Government land surveys conducted in the region between 1816 and 1819 provide information about the distribution of the dominant vegetation types just prior to Euroamerican settlement. The surveyors were required to select two witness trees at each section and quarter section corner and to identify them, give their diameters, and report their bearings and distances from the corners. For trees intersected along section lines, identifications and diameters also were recorded. Surveyors indicated where they entered and left forests, prairies, barrens, swamps, lakes, and streams; they also made general remarks about the vegetation and soils along each section line: the most common trees, the undergrowth, and fitness for cultivation, including wetness of soil.

Figure 8 is a general depiction of presettlement vegetation and lakes for the section of the Illinois between Hurricane and Otter creeks. Figures 9 - 12 are more detailed maps of presettlement vegetation and selected geological features. Along section lines, the early land survey records are the

*Center for American Archeology, Archeobotanical Laboratory Report No. 45.

Figure 8. Early nineteenth century vegetation of the lower Illinois River Valley.

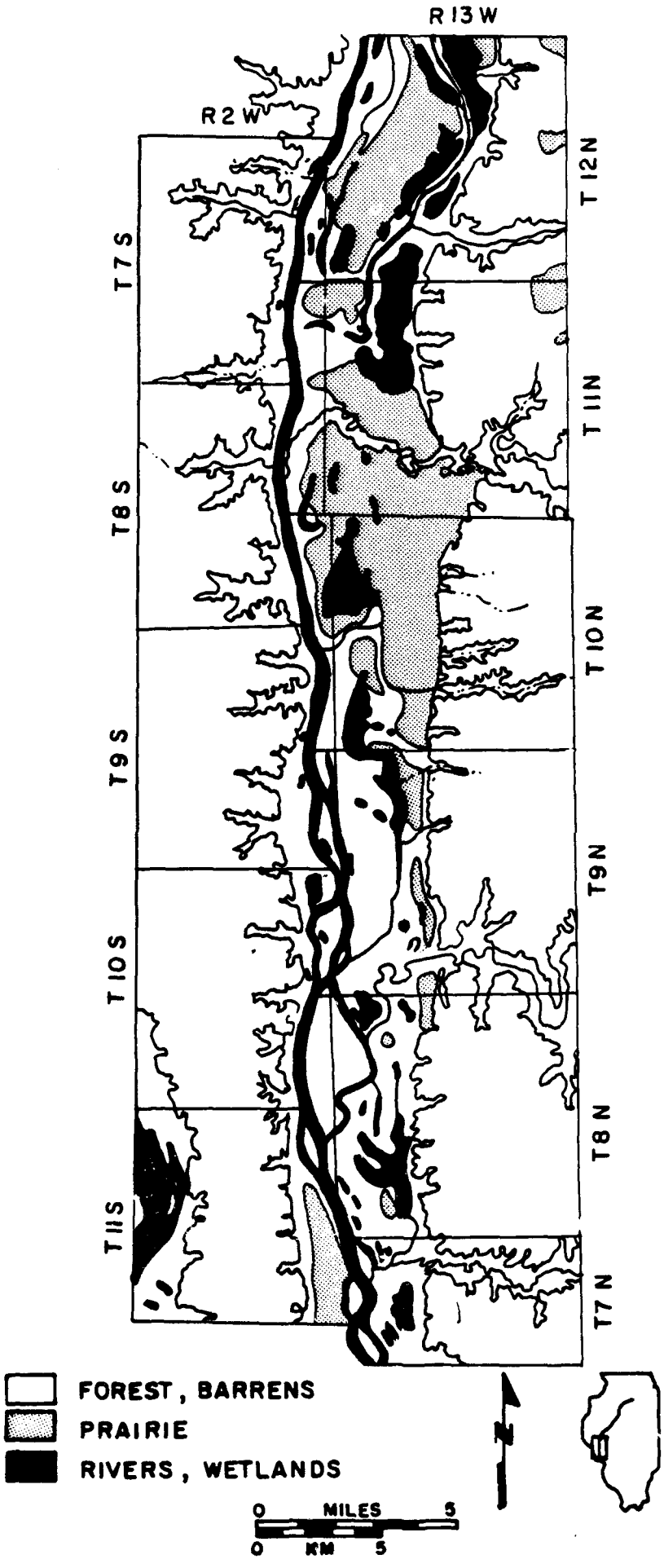

R13W
R2W
T12N
T11N
T10N
T9N
T8N
T7N
T7S
T8S
T9S
T10S
T11S
FOREST, BARRENS
PRAIRIE
RIVERS, WETLANDS
0 MILES 5
0 KM 5

Figure 9. Early nineteenth century vegetation of the Hartwell District. Shinnault Lake and parts of Grassy Lake and Clark Lake were shallow with grass growing in them. The areas of scattered timber around Cade and Clark Lakes were mapped as prairie in 1819 and as "scattering trees" in the resurvey of 1846. Immediately SE of Clark Lake the surveyor did not mention any prairie along the section line, although it seems likely that this part of the Keach School terrace could have been prairie in 1819.

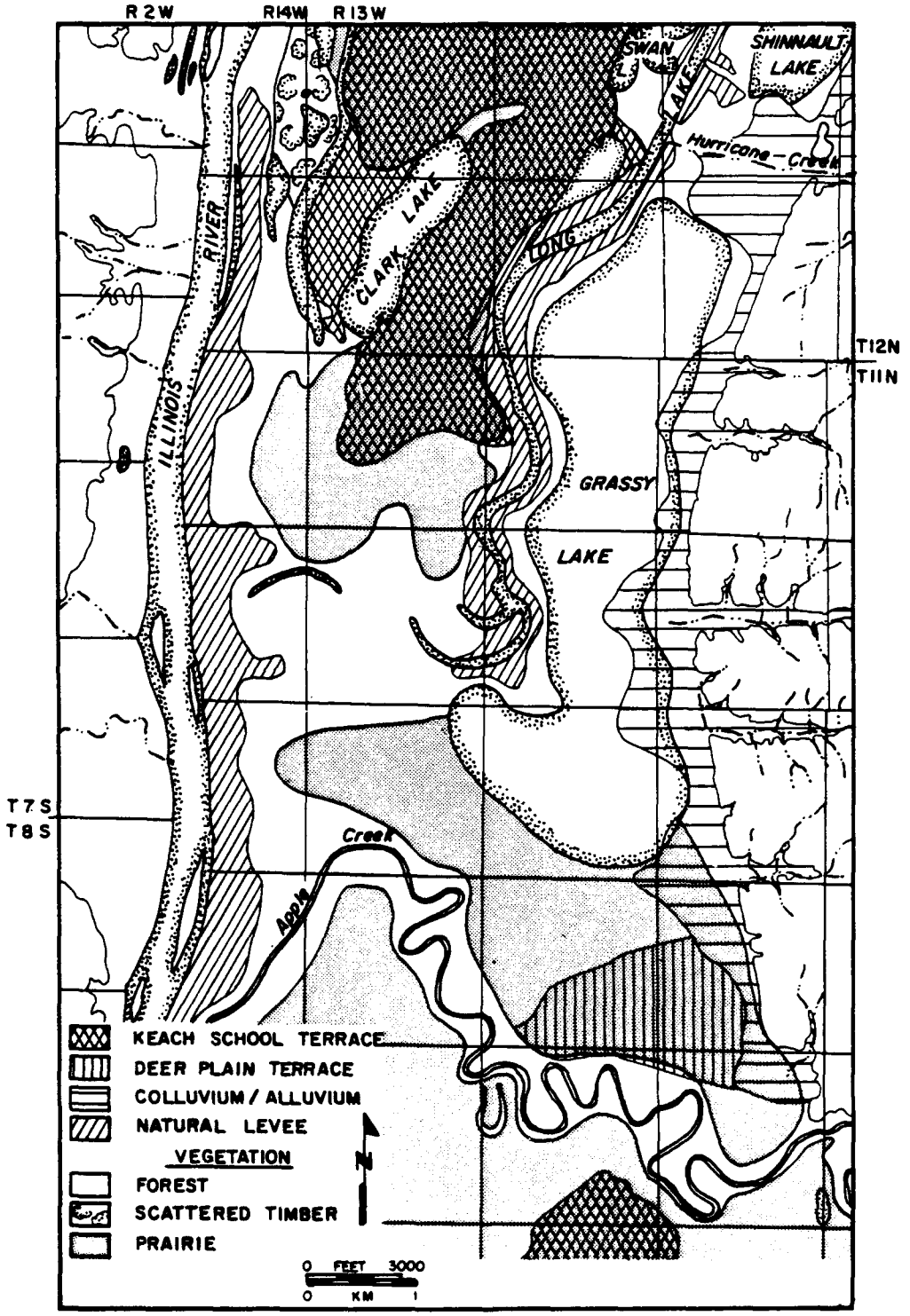

R 2 W
R14W
R 13 W
SWAN LAKE
SHINNAULT LAKE
Hurricane Creek
CLARK LAKE
LONG
ILLINOIS RIVER
T12N
T11N
GRASSY
LAKE
T7S
T8S
Creek
KEACH SCHOOL TERRACE
DEER PLAIN TERRACE
COLLUVIUM / ALLUVIUM
NATURAL LEVEE
VEGETATION
FOREST
SCATTERED TIMBER
PRAIRIE
N
0 FEET 3000
0 KM 1

Figure 10. Early nineteenth century vegetation of the Keach School Levee District. According to the land surveyor, French Pass Lake did not cross the section line in 1818. He mapped the area as "mostly level wet prairie". However, a Woermann topographic map shows that the north end of the lake crossed the section line in 1904. Perhaps the lake level was low when surveyed in December 1818.

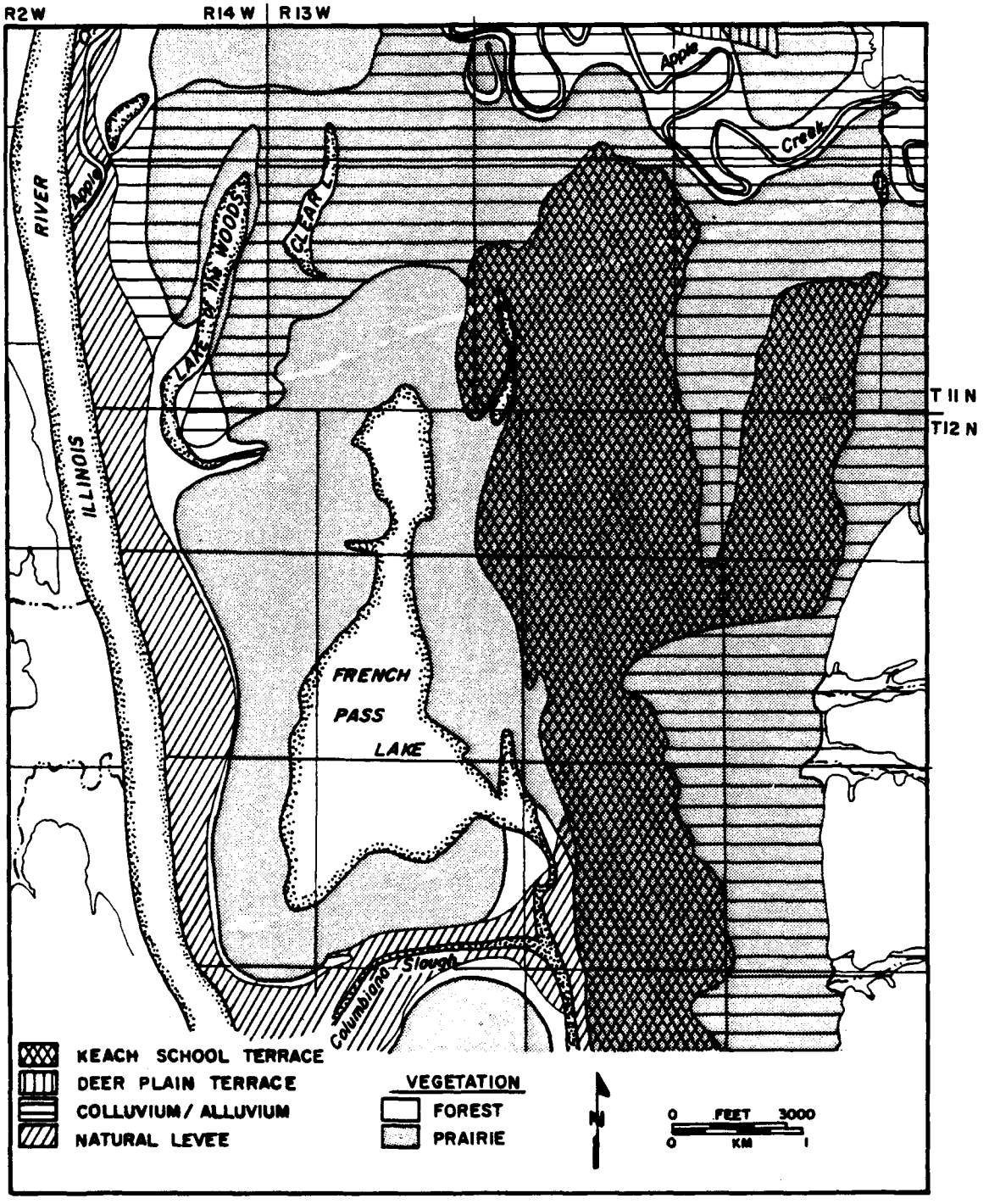

R2W
R14 W
R13W
T 11 N
T12 N
ILLINOIS RIVER
Apple
Creek
CLEAR
LAKE
PINE WOODS
FRENCH
PASS
LAKE
Columbia
Slough
KEACH SCHOOL TERRACE
DEER PLAIN TERRACE
COLLUVIUM / ALLUVIUM
NATURAL LEVEE
VEGETATION
FOREST
PRAIRIE
0 FEET 3000
0 KM 1

Figure 11. Early nineteenth century vegetation of the Eldred Levee District. Early county atlases show no connection between Potato Prairie Lake and the unnamed lake to the southeast. The Woermann topographic maps (1902-04) suggest that there may have been a connection between the lakes at times of high water as illustrated above.

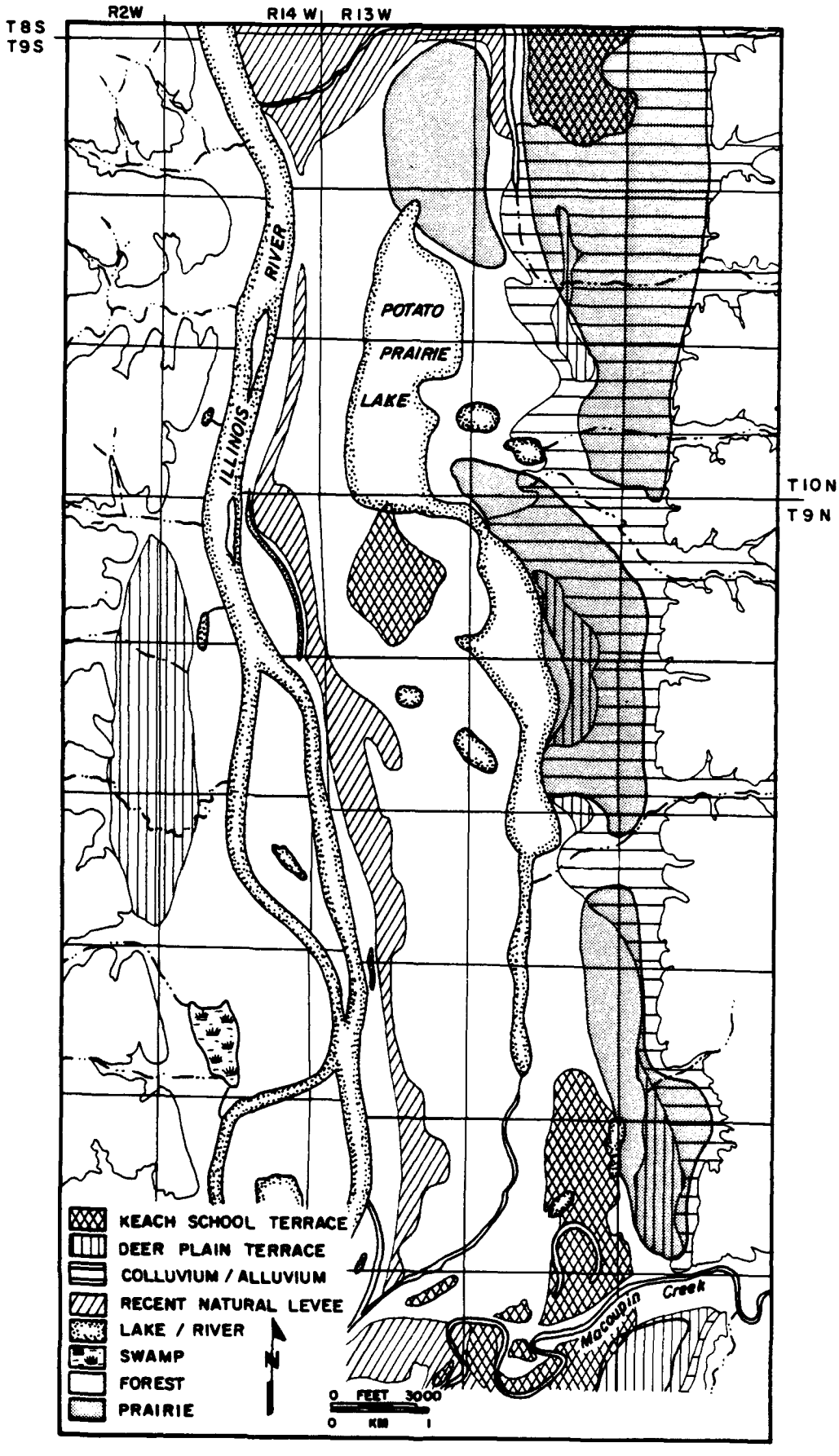
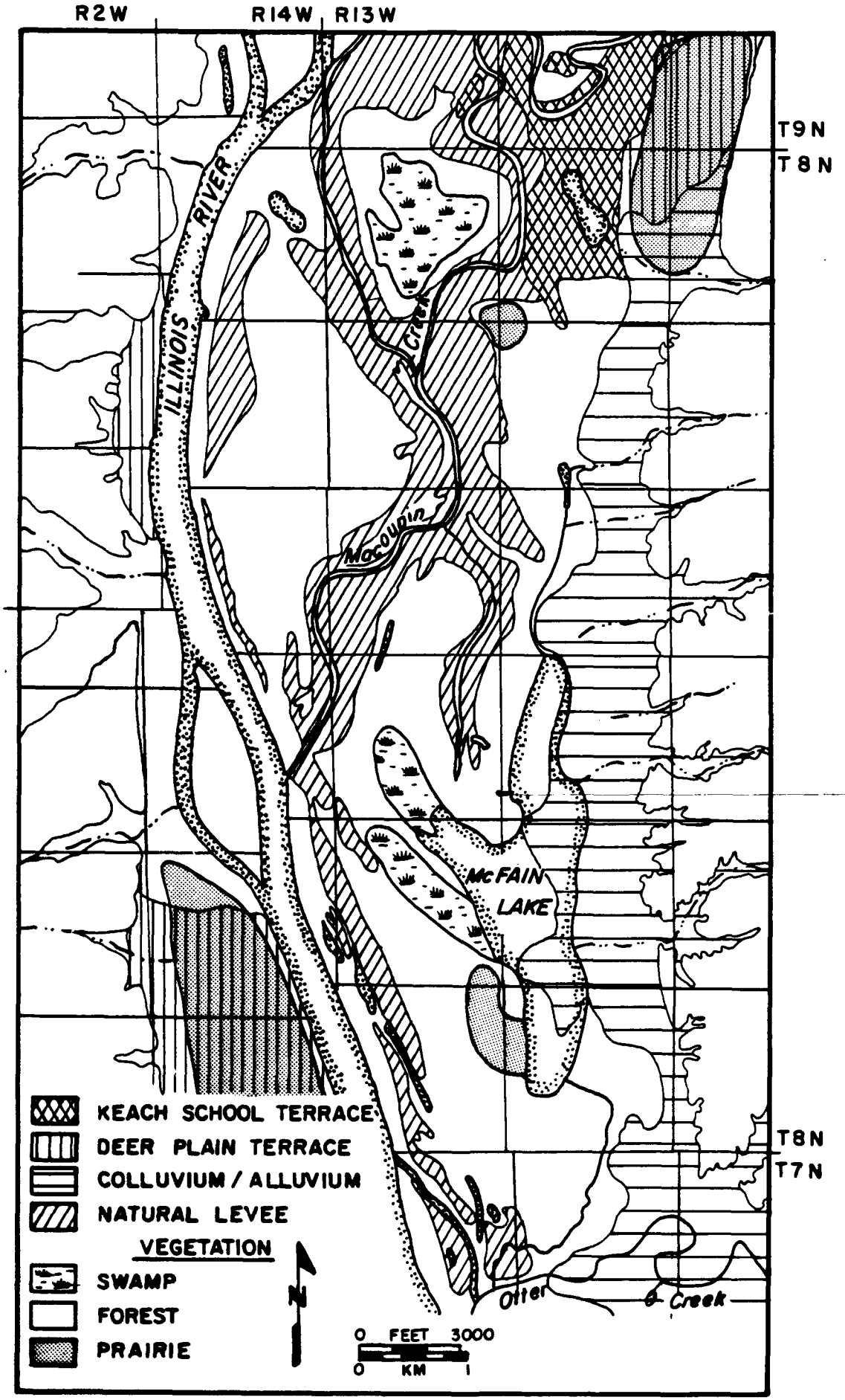

R2W
R14 W
R13W
T8S
T9S
T10N
T9N
ILLINOIS RIVER
POTATO
PRAIRIE
LAKE
Macoupin Creek
KEACH SCHOOL TERRACE
DEER PLAIN TERRACE
COLLUVIUM / ALLUVIUM
RECENT NATURAL LEVEE
LAKE / RIVER
SWAMP
FOREST
PRAIRIE
N
0 FEET 3000
0 KM 1

Figure 12. Early nineteenth century vegetation of the Nutwood Levee District. Boundaries of McFain's Lake were drawn from U.S. government land surveys (April 1819) and the 1893 plat book of Greene and Jersey counties. Possibly the water was unusually high in 1819 since the surveyor described it as "a pond with trees in it" between sections 30 and 29. However, the 1819 surveys and 1893 plats essentially agree at the points where the lake crosses section lines. The 1902-04 Woermann topographic maps suggest that the lake should have been much smaller.


R2W
R14W
R13W
T9N
T8N
T8N
T7N
ILLINOIS RIVER
Creek
McCoupin
McFAIN LAKE
Otter
Creek
KEACH SCHOOL TERRACE
DEER PLAIN TERRACE
COLLUVIUM / ALLUVIUM
NATURAL LEVEE
VEGETATION
SWAMP
FOREST
PRAIRIE
N
0 FEET 3000
0 KM 1

primary source of information concerning the location of forest and prairie, lakes, and stream channels. Between section lines, the vegetational distribution was inferred from correlations between vegetation and topography. Lake boundaries were approximated from nineteenth century county atlases (Arnold 1861; Andreas, Lyter & Co. 1873; Hammond Publishing Co. 1893) and from a topographic map made by the U.S. Army Corps of Engineers at about the time major drainage and leveeing activities began (Woermann 1902-1904). The geological units were mapped by Edwin Hajic. Zawacki and Hausfater (1969) mapped presettlement vegetation in the vicinity of Apple Creek. The maps in the present report differ in several respects from their reconstruction, which relied extensively on township plats drawn from the original survey notes by the Office of the Surveyor General of Illinois in 1862. The Surveyor General's cartographers interpolated between section lines apparently without the aid of additional information.

In presettlement times the vegetation of the Illinois Valley bottomlands and surrounding upland regions was a mosiac of forests and prairies whose diversity was largely a consequence of the diversity in topography. Topographic gradients influenced important variables such as soil moisture, susceptibility to flooding, alluviation and soil erosion, intensity of light, exposure to winds, and vulnerability to forest or prairie fires. In the uplands, prairies occurred mostly on flat lands and gentle slopes of less than 4%, while forests

occupied slopes greater than 4% (Asch, Ford, and Asch 1972:22). Dry forests, dominated by black oak, white oak, and hickory, (see Appendix E for scientific names), occurred on the upper slopes and invaded the narrow ridgetops of the dissected lands adjacent to the Illinois Valley, where prairies might otherwise have occurred. Ridgetops were commonly described by the surveyors as being "thinly timbered" or as "barrens". (Barrens were grasslands with a scattering of trees and varying degrees of brushiness.)

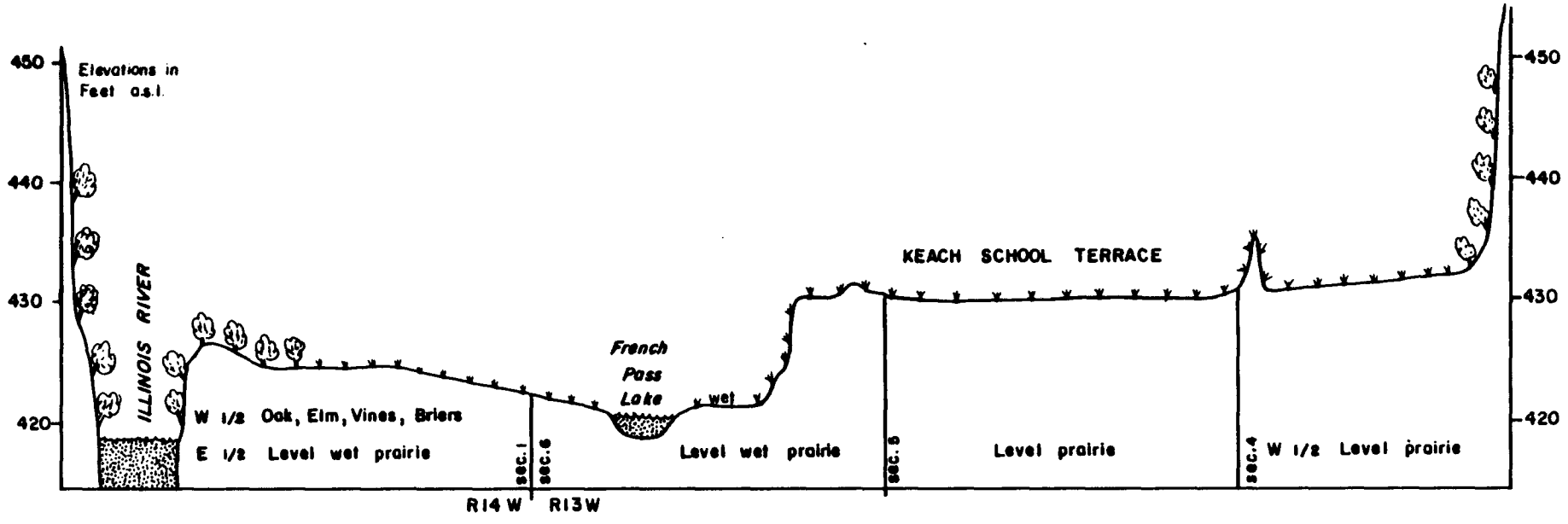
Small hill prairies do occur on very steep loess slopes overlooking the Illinois Valley, primarily on upper southwest-facing slopes (Evers 1944). They owe their existence and persistence to an extreme microclimate caused by exposure to the hot afternoon sun and to the predominately westerly winds. Hill prairies have short bunchgrasses more typical of prairies hundreds of miles to the west.

Lower hillslopes and more protected north-facing slopes were covered with a more mesic forest that included trees such as white and red oak, sugar maple, elm, and hackberry.

Bottomland forests during the early nineteenth century were located on islands, along the Illinois River shoreline, adjacent to secondary creek channels, in some of the wetlands, and along the valley margins on alluvial fans and colluvial wash. The remainder of the bottoms were occupied by prairies and wetlands.

The bottoms are nearly level, but the lowland microtopography exerts a strong influence on the vegetation. Figure 13,

Figure 13. Vertical cross-section of the lower Illinois Valley. The transect is at the northern edge of T10N R13W and R14W (see Figure 10). Elevations are from 1904 Woermann map (1 ft. contours); the vertical exaggeration is 180X. Vegetation is from the original U.S. government land surveys (n.d.).


450
440
430
420
Elevations in Feet a.s.l.
ILLINOIS RIVER
W 1/2 Oak, Elm, Vines, Briers
E 1/2 Level wet prairie
sec.1
sec.6
French Pass Lake
wet
Level wet prairie
KEACH SCHOOL TERRACE
sec.5
Level prairie
sec.4
W 1/2 Level prairie
R14W
R13W

a cross-section of the Illinois Valley, illustrates the relationship of vegetation to topography at one locality. Table 1 summarizes the characteristic vegetation of some lowland microenvironments. A few centimeters of relief in a floodplain can make important differences in duration and depth of flooding and in the moisture content, aeration, and temperature of the soil. Adjacent to the river channel and major secondary streams are low natural levees, behind which lie poorly drained alluvial flats. Shallow backwater lakes -- some seasonal, some permanent -- were situated on the alluvial flats. The alluvial flats were subject to inundation by spring floods. Also, small creeks dumped their intermittent waters into these low-lying lands rather than maintaining a channel to the river. The Keach School and Deer Plain terraces are higher in elevation and consequently seldom or never flooded.

There is little overlap in the species composition of lowland and upland forests. The bottomland forests also are variable in composition. As described by Klein, Daley, and Wedum (1975), the characteristic trees along a gradient from wetter to more mesic environments and from pioneer to more stable successional stages are, first, willows, usually occurring as a narrow band along the river banks and slough margins; next, silver maple, cottonwood, boxelder, and American elm; and finally, pin oak. The mesic end of the range has greater diversity and includes trees such as pecan, sycamore, black walnut, sugarberry, honey locust, and shellbark hickory.

Table 1. Bottomland plant communities of westcentral Illinois (early nineteenth century).

HABITAT	DOMINANT SPECIES, other components
RIVER - BACKWATER LAKE	"aquatic weeds" (Grigg and Elliot, 1837:34, 35: the Illinois River is wide and deep and, for the greater part of its width, is filled with aquatic weeds, to such a degree that no person could swim among them. Only a few yards width, in the center of the stream is free from them), grasses (in some shallow lakes)
RIVER SHORELINE	
1. annual plant zone	amaranth (water hemp), beggar-ticks, cocklebur, *Chenopodium bushianum* (goosefoot)
2. perennial plant zone	duck potato, smartweed
3. tree zone (low banks)	WILLOW
WET FLOODPLAIN	
1. forest	SILVER MAPLE - COTTONWOOD, American elm, willow, swamp privet, green ash, pecan, boxelder, red mulberry
2. swamp	willow, buttonbush, swamp privet
3. marsh	cattail, duck potato, lotus, bulrush, smartweed, nutgrass
4. prairie	SLOUGH GRASS, ricecut grass, smartweed, milkweed, marshelder
WET - MESIC FLOODPLAIN	
1. forest	PIN OAK, silver maple, pecan, deciduous holly, sugarberry, ash, American elm, red mulberry, hawthorn, grape vines
2. prairie	SWITCHGRASS, sloughgrass, big bluestem
MESIC FLOODPLAIN	
1. forest (bluffbase, secondary valleys)	pecan (Ill. and Miss. valleys only), kingnut (shellbark) hickory, shagbark hickory, bitternut hickory, swamp white oak, shingle oak, bur oak, black walnut, butternut, American elm, slippery elm, basswood, persimmon, sugarberry, hackberry, Ohio buckeye, redbud, hornbeam, ironwood, sugar maple, honey locust, boxelder, sycamore, ash, sassafras
2. prairie	BIG BLUESTEM, Indian grass, dropseed

Based on identifications by land surveyors, Zawacki and Hausfater (1969) consider black oak to have been a major tree of bottomland forests. It does not occur in the floodplain today in this section of the valley and is unlikely to have been there in the past. Undoubtedly, surveyors misidentified most of the pin oaks as black oaks.

The bottomland prairies of the Midwest tended to be of two types: (1) a sloughgrass association on wet, poorly aerated alluvium, and (2) a big bluestem association on higher ground that is seldom or never flooded (Sampson 1921, Schaffner 1926, Turner 1934). Accordingly, sloughgrass was probably dominant in the prairies of the alluvial flats, and big bluestem was probably dominant on the terraces. The bottomland big bluestem prairies were similar in composition to the upland tallgrass prairies of Illinois.

The respective distributions of forests and prairies in the bottomlands of the Illinois Valley are not a simple correlate of elevation. Some prairies, for example, graded from higher ground into marshes and lakes, and some forests were continuous from the river shoreline to the bluffs. We hypothesize that two factors largely determined the prairie-forest distribution. One is susceptibility to sedimentation. Where there has been rapid sedimentation, tree seedlings apparently have a competitive edge over perennial prairie grasses -- hence, the distribution of forests adjacent to stream channels.

Duration of flooding may be a second critical factor.

The north end of the study region had a high percentage of bottomland prairie, even in the alluvial flats; in the south end of the study region the alluvial flats were occupied exclusively by forest and swamp vegetation. Upstream from its juncture with the Illinois River, the Mississippi has a substantially higher gradient than the lower Illinois: 6 inches per mile for the Mississippi versus 1 inch per mile for the Illinois (Rubey 1952:128). Therefore, during high water on the Mississippi River, the lower end of the Illinois becomes a floodpool of the larger river. If flooding continues late enough in the spring -- after the time that trees begin to leaf out -- sloughgrass prairie would probably be at a significant competitive disadvantage by comparison with trees.

Complicating a reconstruction of prehistoric vegetation are changes that occurred in the regional environment. In central Illinois, open spruce woodland and tundra ended about 13,800 years ago (King 1981:57). By about 10,600 B.P. spruce was entirely replaced in the arboreal pollen record by deciduous tree pollen. The prominence of genera such as elm, ash, the hornbeams, and birch in the ensuing early Holocene pollen record has commonly been interpreted as signifying the existence of a climate more mesic than that of historic times. However, these are also trees which have a potential to migrate more rapidly than the oaks and hickories that eventually dominated Illinois forests. By 8300 years ago, upland vegetation around Chatsworth Bog, Livingston County, central Illinois, appears

to have been dominated by oak (King 1981:58). At the same time, prairie began to appear, marking the beginning of the time-transgressive Hypsithermal in this part of the Midwest. The end of the Hypsithermal in central Illinois is not, according to King, marked by any substantial shift in the relative proportions of prairie and forest, probably because of the lack of a steep climatic gradient in the region.

The foregoing sketch of temporal changes is based on upland vegetation. Besides the lack of a pollen record from the river valley, there are the complicating effects of changes in floodplain geomorphology -- changes which, as Butzer (1977) observes, are only partially tied in with local climatic changes. Recently obtained radiocarbon dates from the bottomlands of the lower Illinois Valley suggest that spruce and other conifers were the dominant forest cover at least until 12,000 B.P. The latest of the samples containing conifer wood and spruce needles, from the upper portion of the Keach School terrace, dated to 12,000 B.P.± 100 (ISGS-911). A local date for re-establishment of deciduous forest cover is not available. Little more can be said than that pecan, a southern species, has been documented archeologically in the earliest components excavated from the region (Koster site) at ca. 8700 B.P. (Asch and Asch, n.d.).

With respect to vegetational consequences of the Hypsithermal for bottomland forests, we can only mention that riparian forests today are maintained far west into the Great

Plains in climates undoubtedly as extreme as those experienced during the Hypsithermal interval in Illinois (Wells 1970a, 1970b). Bottomland vegetational communities along the Missouri Valley in northwestern Missouri and Iowa are substantially similar to those of the Illinois Valley (Weaver 1960). Also, the highly dissected uplands adjacent to the Illinois Valley can be expected to have maintained a mosaic of habitats in which probably even a few mesic trees survived during the height of the Hypsithermal (Asch, Ford, and Asch 1972). King's (1981:59) inference for the uplands in the vicinity of Chatsworth Bog is probably applicable to these uplands as well: "Any late Holocene increase in moisture, defining the end of the Hypsithermal, would have resulted primarily in changing the spatial arrangement of the mosaic and not necessarily the vegetation."

CHAPTER 3

Previous Archeological Studies

The 1980-1982 survey boundaries were in response to needs of the Army Corps of Engineers and are based on criteria not necessarily equivalent to survey boundaries chosen from strictly an archeological perspective. Despite this constraint, it is necessary and possible to place the archeological resources identified during the survey within a regional archeological context.

Information on site distribution and associated artifact assemblages at or near the project area is reviewed and synthesized below. Figure 14 illustrates the location of these and other archeological projects conducted in the lower Illinois River Valley. To provide a broad cultural perspective encompassing the entire lower Illinois River valley through time and correlated with regional cultural development throughout the midwest is beyond the scope of this study. For a synthesis of midwest prehistory see Griffin 1967, Ford 1974, Brown 1977 and Stoltman 1978; see Koski 1981 for a review of lower Illinois River drainage prehistory.

*Lower Illinois Valley Survey, Greene and Scott Counties (Struever and Asch 1966)

This field survey was designed to identify Early Woodland site locations along a series of discontinuous sandridges (Keach School Terrace) parallel to the present river channel. The Burline Sandridge begins just south of canalized Hurricane Creek and extends approximately 10 km north to Morgan Slough (located 6 km south of Little Sandy Creek). The Junction Sandridge lies 7 km north of the Burline Sandridge and is approximately 9 km long. This sandridge begins about 5 km

*This survey was never formally written, hence, this information was obtained from the original survey forms and associated files.

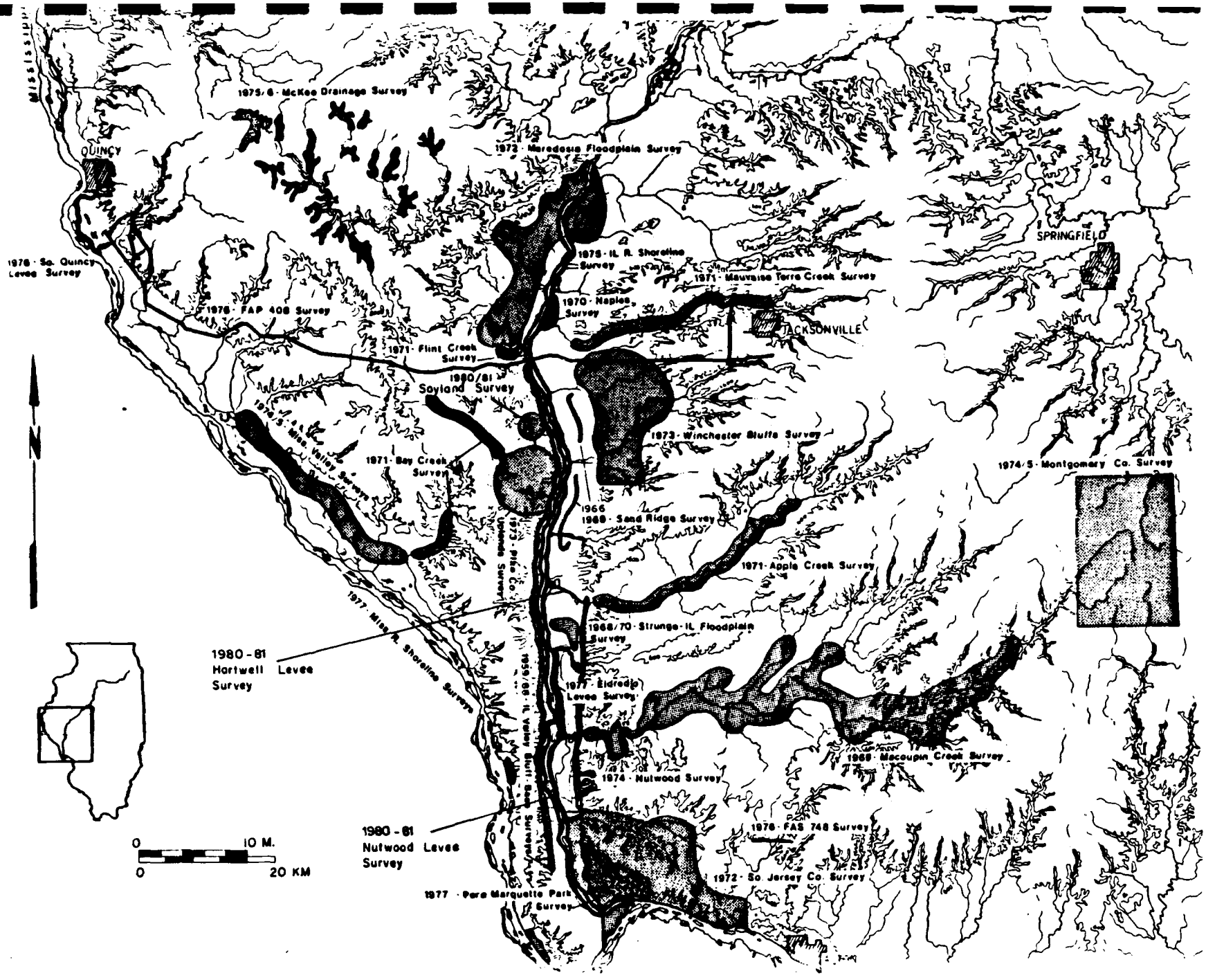


Figure 14: Previous archeological investigations within the lower Illinois River valley.

north of Sandy Creek and ends north of Walnut Creek (Figure 14).

Twenty prehistoric sites were identified. At each site either retouched or non-retouched lithic artifacts and ceramics were collected. The sites were generally located within large areas along the crest and upper portions on the sandridges. Struever concluded that a number of cultural components were represented suggesting extensive utilization of the sandridges through time. A high density of grooved axes, pebble pendants and various projectile points indicated an extensive Late Archaic presence. Based on ceramic evidence all the Woodland periods were represented, although occupancy may have declined during the Middle Woodland period.

Struever also noted that:

1) There is a continuous scatter of non-retouched lithic artifacts along the sandridges.

2) Sites were identified by an increased concentration of non-retouched lithic artifacts and do not signify qualitative changes in artifact distributions.

3) Burnt limestone was rare (this may result from its context in a sandy acidic environment).

4) Ceramic density was lower than lithics though more tightly clustered.

5) Early Woodland Black Sand and Late Woodland ceramics were most common. Middle Woodland ceramics were rare.

6) Faunal remains were absent (possibly due to acidic conditions).

7) Shell remains occurred in low quantities.

8) The quantity of large cobbles, cores hammerstones and nodules was high while the number of decortication flakes was low. This suggests, according to Struever, extensive flint knapping from partially prepared nodules.

*Sandridge Survey, Greene and Scott Counties (Farnsworth 1969)

In 1968, Kenneth Farnsworth re-surveyed the Burline and Junction sandridges. The survey was designed to complete the survey begun by Struever and to revisit sites located in 1966. Farnsworth supports the conclusion drawn by Struever and provides additional information on artifact densities across the sandridges.

Along the Burline sandridge the density of non-retouched lithics between sites is greater south of channelized Hurricane Creek. In contrast, lithic scatters are rare, between sites in the northern portion.

A similar pattern was observed on the Junction sandridge. The southern section exhibits a non-retouched lithics density comparable to that found along the Burline sandridge south of channelized Hurricane Creek. In the northern portion of the Junction sandridge, lithic scatters between sites diminishes.

Finally, Farnsworth observed that only a few ceramics were recovered from Black Sand, Early Woodland sites (suggesting a limited occupation). In addition, on sites containing ceramic scatters the lithic debris density was less than in areas

*Survey forms and field notes, completed during the 1969 survey, were used as the information source.

where sherds are either absent or rare.

Nutwood Watershed Survey, Jersey County (Farnsworth 1975)

This survey was designed to locate archeological sites in an area proposed for the construction of flood control structures by the Soil Conservation Service. The survey area included the valleys and adjacent bluffs encompassing three small creeks that enter the eastern floodplain of the Illinois valley, 2 to 6.5 km north of the town of Nutwood.

The survey identified 12 prehistoric archeological sites. These sites are divided into two groups: 1) one mound site, and 2) eleven non-mound (habitation) sites. Cultural affiliations were assigned to three sites. The Hacker Mound Group dates to the Late Woodland period. The Reddish Farm site is also Late Woodland (Jersey Bluff) and is situated at the bluffbase near the mouth of a small creek. The Gary site dates to the Late Archaic, based on a technological assessment of projectile points.

The nine non-mound upland sites are interpreted as specialized encampments. These sites have been divided into two groups.

Group 1 (six sites). These sites yielded an average of 20 flakes per site and large unifacial and bifacial tools. The retouched pieces were frequently broken suggesting intentional discard rather than accidental loss. Based on the low quantity and limited diversity of recovered artifacts,

these sites are classified as small hunting encampments exhibiting evidence for tool maintenance rather than tool production.

Group 2 (three sites). These sites also contain large unifacial and bifacial tools. However, the average number of flakes per site is considerably greater (235). In addition, hammerstones, grinding stones and cores were also recovered. These sites exhibit a more diverse lithic assemblage indicative of tool production and food preparation.

Nine Foot Channel (Farnsworth 1976)

This survey was initiated as a result of planned maintenance work on the Illinois River navigation channel by the Army Corps of Engineers, St. Louis District. The purpose was to identify surface sites within a 91 meter wide corridor, bounded by the Illinois River. Both the east and west floodplains were surveyed. Major secondary streams entering the floodplain were surveyed to a distance 152 meters upstream from their confluence with the Illinois River. The survey extended from Illinois River Miles 1-80 and includes both the Hartwell (at Miles 38-43.1) and Nutwood (at Miles 15-23.5) levee districts.

Eighty-nine prehistoric and five historic sites were identified. Sixty-six are situated on the floodplain. These sites occur primarily at three locations, bluffbase talus slopes, floodplain sandridges and river shoreline.

Farnsworth records the following observations:

1) The earliest evidence for human occupation dates to the Late Archaic (within the survey area).

2) The presence of all five Late Archaic sites along the bluffbase talus slopes on the west side of the river suggests that much of the river shore and the eastern floodplain side was unstable during the Late Archaic.

3) Early Woodland site distribution suggests the river stabilized during this period.

4) Along the river shoreline the quantity and diversity of sites peaks during Middle Woodland times.

Among the 93 sites identified, two sites are situated within the 1980-81 survey area; one in each levee district. The Ski Inn site is located within the Nutwood Levee District and contains both Middle Woodland Havana pottery and type indeterminate Late Woodland pottery. Four retouched, non-diagnostic chipped stone tools were also collected. At the Mussel Beach site (Hartwell Levee District) Early Woodland and Middle Woodland ceramics, an Early Woodland Kramer projectile point and numerous non-retouched and retouched lithic artifacts were recovered.

Eldred-Spankey Levee Survey (Farnsworth 1977)

This survey was similar in scope to the Hartwell and Nutwood Levee District surveys, 1980-1981. The Eldred-Spankey district is located between Illinois River Miles 24 and 32.2,

immediately north of the Nutwood district.

Twenty-six sites were reported during the survey with 22 located within the project bounds. These include 17 prehistoric and five historic sites. The earliest archeological material dates to a single component Middle Archaic site. It was noted that earlier material may have been destroyed or buried by shifts in the Illinois River channel. The density of floodplain settlement away from the bluffbase during Late Archaic and Woodland times was high.

Along the artificial levee interior five sites were identified. Four sites exhibit multiple components based on the recovery of diagnostic artifacts. The sites are small, with one exception, and contain a light density of lithic material. Two sites show a high diversity of tools indicating a range of activities including tool production and maintenance and food processing. The remaining sites have a more limited range of tool types, are multi-component and probably represent extractive or processing camps.

The sites in the southern portion of the Eldred district along Macoupin Creek are spatially larger and are also probably extractive or processing camps. The two exceptions are much larger sites, exhibit a high level of tool diversity and probably represent a wider range of activities.

Shallow Subsurface Geology, Geomorphology and Limited Cultural Resource Investigations (Hajic and Hassen 1980, Hajic 1981a,b)

In 1980 and 1981 a series of shallow subsurface geologic,

geomorphic and limited surface cultural resource investigations were conducted at the Eldred-Spankey, Nutwood and Hartwell levee districts. These studies, requested by the Army Corps of Engineers, St. Louis District, were designed to determine the potential for encountering buried archeological deposits.

Soil coring across a number of transects provided an opportunity to identify and interpret shallow subsurface sedimentary units, geomorphic features and soils. These geologic and geomorphic investigations occurred in combination with an assessment of surface archeological materials.

1) Areas of the highest potential are those where rapid burial in a relatively low energy environment may have occurred during the Holocene. Colluvium, alluvial fans and natural levees meet these requirements. Within the bluffbase fans archeological deposits as old as the Paleo-Indian period may be preserved. The natural levees along the present Illinois River channel may contain deposits earlier than the Middle Woodland while the interior natural levees along the Old Macoupin Creek channel could preserve deposits as old as the Late Archaic.

2) The Low potential areas represent locales deemed too wet for human occupation due to seasonal inundation. These locations are represented within the lowlying interior floodplain. However, locally high areas may contain cultural materials covered by either flood or lacustrine sediments.

3) Areas having no potential for buried deposits are represented by the outcropping of the terminal Pleistocene Keach School and Deer Plain terraces. These surfaces may con-

tain deposits as early as the Paleo period. However, terrace surface sites may be buried by later alluvial fan sedimentation.

The limited cultural resource investigations resulted in the identification of two previously unrecorded prehistoric sites within the Nutwood district. The Crevasse Splay site is situated on a natural levee associated with a crevasse splay extending from old Macoupin Creek. The presence of a Kampsville Barbed projectile point and the absence of ceramics suggests a Late Archaic affiliation.

The Blackbird site is situated across an alluvial fan at the emborchure of Shaw Hollow into the Illinois River. The site contains Baehr-Pike ceramics, a White Hall vessel and numerous pit features (exposed in drainage ditch walls). A Middle-Early Late Woodland occupation is indicated.

Mortland Island Site Excavation (Koski 1981)

The Mortland Island site is situated along the eastern shore of Mortland Island, opposite the Nutwood District. The site was excavated by the Center for American Archeolcgy in 1978 and 1979 under auspices of the Corps of Engineers, St. Louis District. The site contains cultural components from Early Archaic to late Late Woodland. The early Late Woodland White Hall phase component is the largest. The site is characterized as a seasonal occupation with a diverse representation of activities including: hunting, butchering, hide preparation and plant processing. Both midden and pit features are represented.

Miscellaneous Site Information

Numerous other sites have been reported from both the Hartwell and Nutwood districts. These sites were located either through collector interviews or non-systematic opportunistic surveys. In many cases the sites are recorded but there is no intensive examination of the artifacts. Since a detailed examination and compilation of these sites is beyond the scope of the present survey, pertinent information will be discussed as it relates to the results (see Chapter 6).

CHAPTER 4

Study Goals and Limitations

Goals

The cultural resource studies conducted at the Hartwell and Nutwood Levee and Drainage Districts were designed according to specific aims as established by the Army Corps of Engineers. Rather than developing an evolutionary model regarding human settlement across the floodplain landscape (cf. Hajic and Hassen 1980; Hajic 1981a,b), the intent is to document the presence of archeological sites within a narrow corridor adjacent to existing levees. In addition, preliminary site evaluations are to be provided. Despite the restricted focus, evaluations of sites and recovered artifact assemblages necessitates that analysis is conducted within a broader regional framework (Goodyear et al. 1978).

Documenting changing patterns in land use and resource procurement and utilization within the lower Illinois River drainage is a major focus of ongoing research conducted by the Center for American Archeology.

Information obtained from the Hartwell and Nutwood surveys can contribute to these studies in four major ways:

1) Improve our understanding of the distribution of sites within a particular landscape type in the region

As stated earlier, the Hartwell and Nutwood district surveys were restricted to narrow corridors adjacent to

existing channel levees. Along most of the survey route the surfaces examined were either natural levees or exposed Deer Plain or Keach School Terrace remnants. In isolated areas lowlying floodplain surfaces were also examined.

Although a similar survey occurred within the Eldred-Spankey Levee and Drainage District, this is the first intensive examination of this particular ecological setting within either the Hartwell or Nutwood districts. Previous surveys and site locations provided by amateur collectors have contributed to the identification of a few sites within the survey corridors. However, systematic surveys such as that used for the Hartwell and Nutwood project provide a greater opportunity to document a wider and more representative range of archeological sites. Another important aspect is the ability to identify "empty zones" that contain no archeological sites.

Although survey areas within the Hartwell and Nutwood districts are very similar, differences do exist between the two districts. These differences include the extent of natural levees, landform elevations, floodplain width and early historic vegetation.

Thus, the Hartwell and Nutwood surveys provide additional information from which comparative studies can occur among the floodplain, shoreline and dissected and interior uplands. In addition, there is the added

opportunity to measure the possible effects of small scale difference within a similar ecological setting.

2) Improve our understanding of the utilization of the wider regional landscape during specific cultural periods in the prehistory of westcentral Illinois

The Hartwell and Nutwood surveys will provide an additional perspective on the use of the Illinois River drainage by specific prehistoric groups. Previous studies along the Illinois River shoreline and the dissected and interior uplands illustrate differential utilization of the landscape by Archaic and Woodland peoples. The distribution, diversity and absence of sites along the natural levees and terrace remnants will contribute toward modeling changes in settlement-subsistence strategies.

3) Improve our understanding of the nature and distribution of small limited activity sites across the landscape

The goal of the Hartwell and Nutwood surveys is to identify the presence of archeological sites. Regardless of their extent all sites are recorded. Frequently, small, limited activity sites fail to receive the attention usually accorded larger, more complex, multiple activity sites. This is unfortunate since the smaller, less complex sites are equally informative and important.

If prehistoric resource procurement, technology, and social interaction are to be understood it is essential that the character and distribution of all sites are

evaluated. The present survey provides an opportunity to identify and evaluate site types that will add greater dimension to settlement-subsistence studies.

4) Improve upon existing models regarding Holocene floodplain evolution and the potential for encountering surface and buried sites

Recent studies have discussed the Holocene evolution of the lower Illinois Valley floodplain (Hajic and Hassen 1980; Hajic 1981a,b,c; Hajic and Styles 1981). Interpretations have been proposed regarding changing depositional environments, effects of climatic fluctuations and the development of Illinois River and secondary stream channel stability. These models are based on an assessment of surface landforms, subsurface geology and distribution of surface archeological sites.

One aspect of Holocene floodplain development that is critical regarding the distribution and diversity of sites across the floodplain landscape is a determination for river channel stability and location. The distribution of archeological sites and the identification of temporally diagnostic artifacts can be important factors for determining channel stability and location by providing minimum dates for occupied surfaces.

Thus, the location of the survey corridors atop natural levees in close proximity to the present river channel provides an opportunity to contribute toward a relative chronology for floodplain evolution from both a geological and cultural perspective.

Limitations

The cultural resource survey in the Hartwell and Nutwood Districts was restricted to surface reconnaissance. A number of factors can preclude discovery of all sites when only surface reconnaissance techniques are used, and can impede evaluation of specific site integrity. Those factors include: vegetation

cover, sedimentation and site burial, plowing, modern disturbance, collection bias and amateur collectors.

1) To locate surface sites it is necessary to view a surface that is virtually vegetation free. Ground cover can obscure surface visibility and mask the extent and possibly the presence of sites. Shovel testing is a technique that helps to diminish the problem but does not solve the situation. Thus, interpretations of site boundaries and the absence of sites when surface survey conditions are less than ideal must be approached cautiously. Within the Hartwell-Nutwood Districts, shovel testing was required in less than 10 percent of the survey area.

2) Site burial. Certain topographic features can reduce the ability to locate sites. Sedimentation by alluviation and colluviation may bury sites. Detection of subsurface sites during a surface survey is almost impossible. Occasionally, sites that are not too deeply buried can be located if plowing brings the archeological material to the surface. Shallow subsurface geologic evaluations can assist in designing models that illustrate areas where the potential for buried cultural deposits is high. In a series of projects funded by the Corps of Engineers, St. Louis District, an attempt is being made to investigate the Holocene evolution of the lower Illinois River valley (Hajic and Hassen 1980; Hajic 1981a,b). Through an extensive program of transect coring an evaluation has been made regarding the potential of encountering buried cultural deposits. These studies are based on an ability to identify and interpret depositional environments and to trace their spatial dimensions. The models that are generated are general in nature but do provide an opportunity to evaluate

the potential for encountering buried cultural deposits. Thus, the absence of surface archeological material should be approached with caution when the potential for buried deposits is high.

3) Plowing. Agricultural cultivation has a destructive effect upon cultural materials located on or near the surface. Plowing may disturb the context and quality of material preservation to the extent that the original association of artifacts and features may be masked. Accurate determinations of site size may also be affected. Until the subsurface dimension of each site has been investigated, it is not possible to assess the overall impact of plowing.

4) Erosion. Erosion resulting from plowing atop ridges, levees and terrace remnants will affect the soil matrix surrounding archeological material. This may result in artifact displacement down slope, artifact burial and mixing of artifacts between occupations. Based on the surface survey, it is not possible to determine the extent of damage due to erosion.

5) Modern disturbances. A number of additional modern disturbances other than plowing may disturb or obliterate archeological material. These include farm house and farm building construction and road development. While the affect of these activities may be minimal within the survey corridors at the Hartwell and Nutwood districts, an additional disturbance resulting from levee construction and stream channelization may be greater. Levee construction will effectively bury any archeological material laying underneath, while stream channelization will destroy the integrity of archeological deposits located within the excavated channels.

6) Collection bias. Once a site is identified in the field, a number of factors contribute toward creating potential bias in the types and quantity of recovered artifacts (Goodyear, House and Ackerly 1979). Despite similar training the ability of surveyors to consistently perform during an entire day will vary under different weather conditions. For example, at the end of a hot day an ability to accurately recognize dark colored ceramics within a dark soil matrix may diminish. The purpose of the survey is to locate sites, identify temporal components and to determine spatial dimensions. Compliance with the scope of work required the focus at each site to be the recovery of those artifacts providing the most critical information. Consequently, only temporally diagnostic artifacts, retouched and otherwise shaped lithics, ceramics and subsistence remains were recovered. The density and spatial dimensions of the nonretouched lithics were assessed in the field.

7) Amateur collectors. The effect of collectors removing artifacts from sites cannot be accurately determined. Nevertheless, collectors are known to frequent sites within the survey area and it would be expected that diagnostic projectile points, exotic items and/or ceramics have been removed from the archeological record.

Items 1 - 7 represent constraints affecting either the location or evaluation of archeological sites using surface reconnaissance. As stated above, the purpose of the Hartwell and Nutwood surveys is only to locate surface archeological sites and estimate their distribution, extent and antiquity. Should future design plans require activities that will impact these archeological sites, it is anticipated that the Corps of Engineers will assess the potential disturbance or possible burial of archeological deposits through subsurface

test excavations. Subsurface testing is specifically designed to address the disturbance issue, to investigate preservation of subsurface remains, and to assess the overall significance of each site for pursuing archeological research problems.

As with any archeological survey that precedes a construction project, the Hartwell and Nutwood surveys have been set up with archeologically-artificial study boundaries. Unlike items 1 - 7 above, which may create disturbances or bury cultural deposits, the spatial constraints of the survey corridor affect the interpretation of the social context of sites found. Thus, sites outside the survey boundaries directly related to sites located within the study area may go undetected. While this will restrict somewhat the interpretation of known sites, it is through this cumulative process of project-by-project information gathering that regional prehistoric settlement-subsistence patterns will eventually merge.

CHAPTER 5

Organization of Fieldwork and Laboratory Procedures

Fieldwork

The survey was designed to locate surface archeological sites within a 45 meter corridor along the interior of the Hartwell and Nutwood levees. Field techniques included pedestrian reconnaissance and shovel testing.

Surface visibility in the Hartwell district was good. Most fields were either plowed or disked. Since the survey was initiated during the Fall, bean plants and corn were high in some portions. Transect intervals were approximately ten meters when visibility was good. In locations where beans inhibited surface visibility the interval was shortened to seven meters.

One portion of the Nutwood levee was covered with trees and beans (Figure 16). This necessitated shovel testing at five meter intervals. Shovel testing requires excavating a hole approximately 30 cm in diameter and 40 cm deep. The soil is removed, broken up, examined for the presence of cultural materal and the hole is refilled. Cultural material was not found in any of the shovel tests.

Whenever possible landowners and/or tenants were interviewed for information on previously unreported archeological finds, or sites. This information is discussed below in the section detailing the project results.

In two areas, it was not possible to survey.

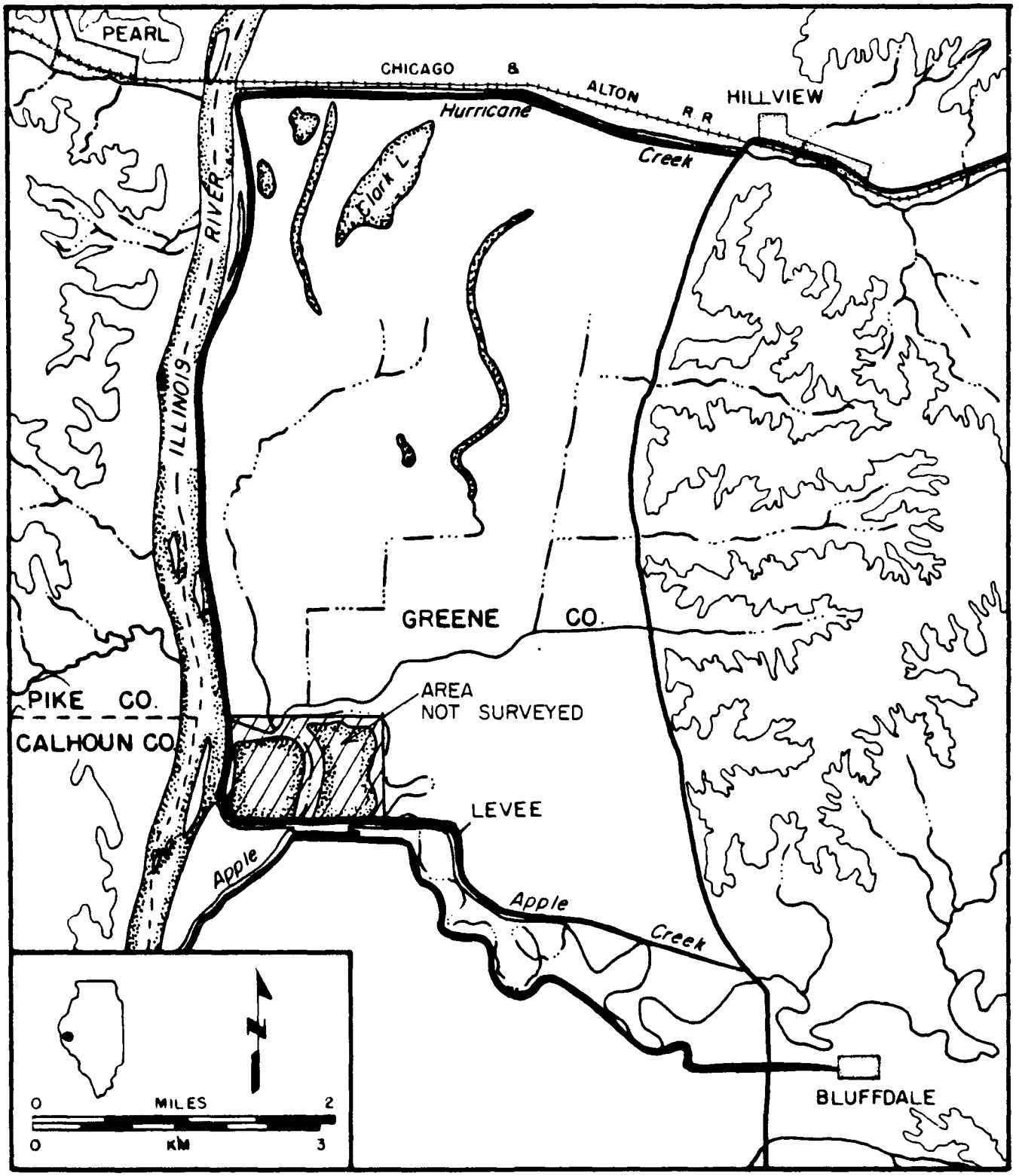


Figure 15. Hartwell Levee and Drainage District, unsurveyed area.

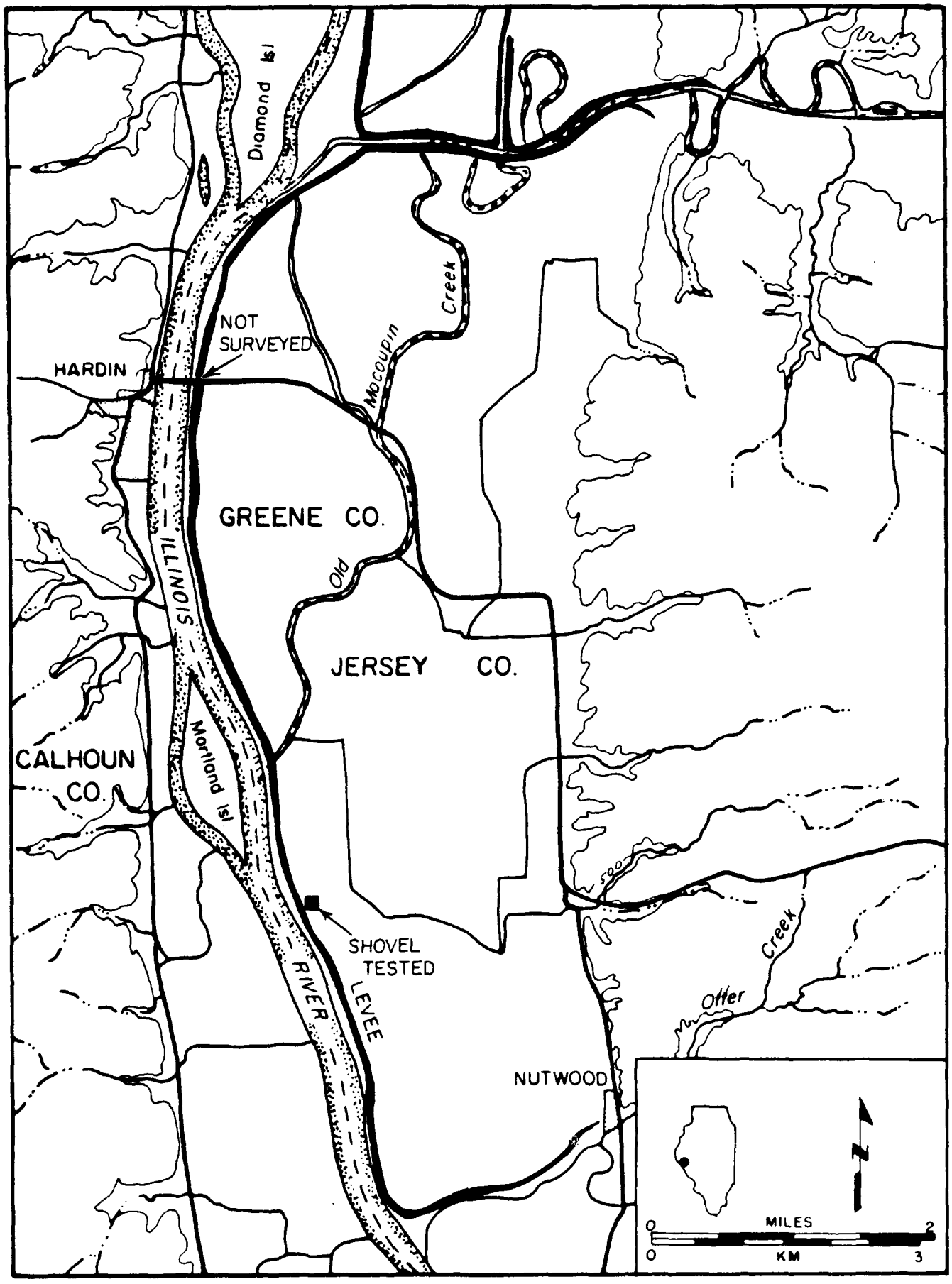


Figure 16. Nutwood Levee and Drainage District; shovel tested and unsurveyed areas.

The first area is a permanent swamp 1.7 km long and situated in the extreme southwest portion of the Hartwell district (Fig. 15). The second area is a .5 km long section situated in the town of East Hardin (Figure 16).

Field walkover forms were completed for each area surveyed. When a site was encountered, a site survey form was also completed. Copies of all survey forms are included as Appendix F.

During site surveys surface materials were marked with surveyors flags. After the site was walked the surface site limits were determined by the distribution of the observed material. If the scatter extended across a large area, surface site limits were determined by variations in debris density. Final determination of site limits were decided during analysis.

During the site survey all observed culturally modified chipped and ground stone artifacts were collected. Differences in debris densities, presence of features, differential distribution of various material and preservation quality for bone and shell were noted. Sketch maps were prepared for all sites and their locations were plotted on aerial photographs and U.S.G.S. quadrangle maps.

One difficulty arose concerning the Burline sandridge. This sandridge is a portion of the Keach School Terrace south of the present Hurricane Creek channel and west of the old bed for Clark Lake. During the 1980-81 survey this ridge was

collected as a single unit. A continuous scatter of lithic material can be observed, however, areas of concentrated materials can also be seen.A Previous survey (cf. Farnsworth's 1969 Sandridge survey) has identified these areas and regarded them as separate sites. Although these site distinctions are maintained for analysis, the combining of the surface artifacts from the 1980-81 survey necessitates that the 1980-81 artifact assemblage be treated as a single unit.

Laboratory Procedures

A literature search was conducted to assemble information on known archeological sites in or near the Hartwell and Nutwood Levee districts. Both the Center for American Archeology and the Illinois Archaeological Survey site files were examined. Information obtained from these files concerning site distribution and artifact assemblages is incorporated for comparative purposes under two sections, "Previous Archeological Studies" and "Results".

County plat books and U.S.G.S. maps were examined to determine the potential for encountering historic archeological sites.

All materials collected during the 1980-81 field survey were washed, labeled, tabulated and curated according to the specification of the scope of work and standard Contract Archeology Program procedures Center for American Archeology n.d.). Tabulation and identification of material classes will vary among projects depending on

the research questions addressed. Since this process is critical to any analysis, the methods used for this study are presented below.

Figure 17 illustrates how the artifact assemblage was classified into varying material classes. Definitions are provided in Appendix G. A number of measurements were obtained for all retouched lithic artifacts, including: 1) maximum length, 2) maximum width perpendicular to the ML, 3) weight, and 4) edge angle (see Appendix B). In addition, all lithic artifacts were assessed for raw material, technology and possible function.

Ceramic artifacts were examined for paste, temper, decoration, surface treatment and vessel portion. Chronological and cultural affiliation are presented when possible.

Projectile points are traditionally used as temporal markers based on technological and morphological criteria. Unfortunately, there is a paucity of projectile points within the lower Illinois River valley that are closely correlated with known carbon-14 dates. Consequently, projectile points are chronologically arranged based on attributes exhibiting a range of variation within and between time units. In the absence of strict temporal controls it is unclear whether some attributes are temporally and/or spatially significant.

Because of the lack of clarity among many projectile point "types", the projectile points recovered during the levee surveys were analyzed at two levels. First, a conven-

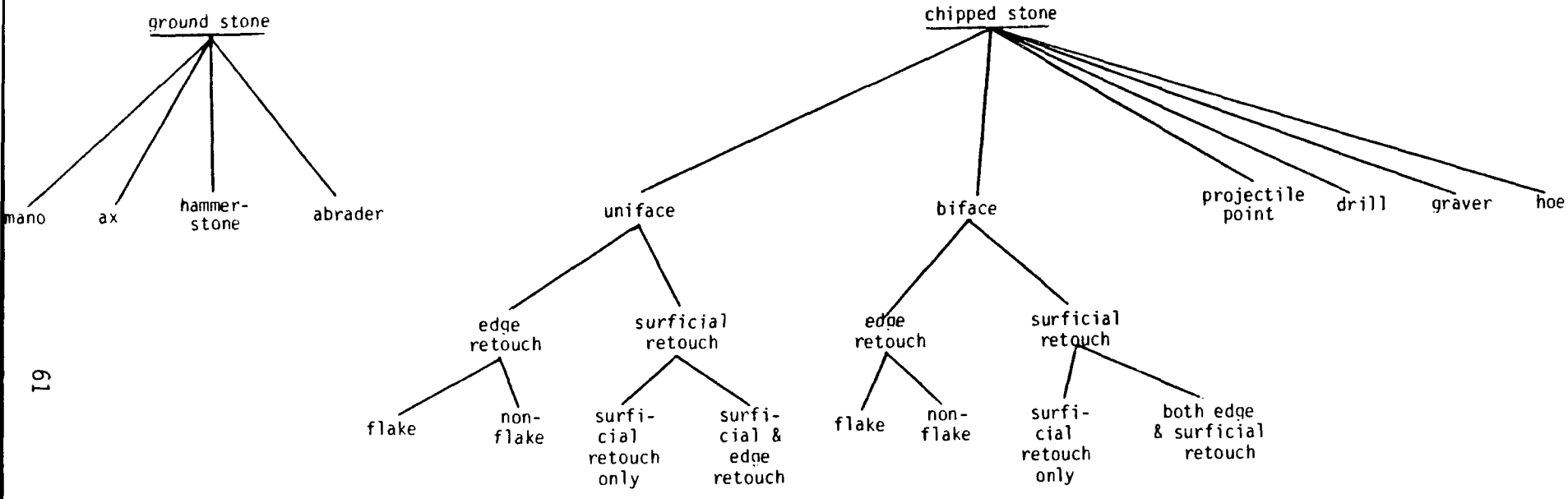


Figure 17. Lithic Artifact Classification

tional approach based on established morphological and technological criteria was applied and the specimens were assigned to standard typological categories. Second, as part of an ongoing CAA emphasis on developing a projectile point typology for the lower Illinois Valley region a series of measurements were recorded (Spitzer and Batura, n.d.). This method is discussed in greater detail in Appendix C.

CHAPTER 6

Results

The Hartwell and Nutwood Levee and Drainage District surveys identified twenty-three archeological sites. The survey was designed to locate prehistoric and early historic habitation and/or mortuary sites. All sites reflect prehistoric occupation. Only twentieth-century historic material was found. No mortuary sites were identified. One isolated artifact could not be assigned to any particular site. Some sites contain a single component, some as many as six. A component is characterized by an artifact assemblage representing a particular cultural period. Some sites may have multiple occupations represented within a specific component. Descriptions for each site are summarized in Appendix A and include: 1) state site number, 2) legal location, 3) physiographic setting, 4) field conditions during the survey, 5) approximate area of scatter, 6) landscape description, 7) criteria for delineating site, 8) presence of midden or features, and 8) presence of within site artifact surface concentration.

Fifteen sites (65%) contain temporally diagnostic artifacts. Twelve sites (52%) have projectile points from a particular time period and ten sites (43%) have diagnositc ceramics. Two sites contain possible middens and a third has a possible pit feature. The feature was brought to the surface during plowing and is characterized by igneous cobbles and bone.

Table 2 summarizes the quantity and diversity of artifacts recovered. The sites are arranged according to levee districts.

Table 2. Site Artifact Summary[1]

Site:	Ceramics		UNIFACES				BIFACES							GROUND STONE						TOTAL LITHICS	Diversity index[2]
			flake w/edge retouch only	non-flake w/edge retouch only	unifacial surficial retouch only	unifacial surficial & edge retouch	flake w/edge retouch only	non-flake w/edge retouch only	bifacial surficial retouch only	bifacial surficial & edge retouch	projectile points	drills*	gravers*	hoe	3/4 grooved axe	mano	hammerstone	abrader	Dongola-exotic chert, flakes	bone**	historic	
(Nutwood Levee District)	ct	wt																			
F.S. Field	31	87	3	3					6	1	2										15	.31
Gravity																	3				3	.06
Hidden Ridge	4	30							1										1		2	.06
Fox Pup																					0	-
(Hartwell Levee District)																						
Bent Fork									1												1	.06
Blue mornin				1				1		3											5	.19
Broken Horseshoe			1			1			2	2											6	.25
Fallen Timber			1			1		1	2	2		2			1		2				13	.50
Half Circle			2					1	2	1	1										7	.31
Narrow Sandy						1			2	5	2										8	.25
Quasar	6	54	1		1	3			11	36	10	3					2	1			68	.56
Levee Bend																					0	-
Bullseye	75	423	1			1			6	8	5	1					1			13 1	23	.44
Wild Onion	2	9	5	1		1		2	9	4	8			1			1				32	.56
isolated									1												1	

*Implies technological differences from other categories and does not necessarily denote function.
**Represents a small mammal.

Table 2. (continued)

Site:	Ceramics		UNIFACES: flake w/edge retouch only	UNIFACES: non-flake w/edge retouch only	UNIFACES: unifacial surficial retouch only	UNIFACES: unifacial surficial & edge retouch	BIFACES: flake w/edge retouch only	BIFACES: non-flake w/edge retouch only	BIFACES: bifacial surficial retouch only	BIFACES: bifacial surficial & edge retouch	BIFACES: projectile points	BIFACES: drills*	BIFACES: gravers*	BIFACES: hoe	GROUND STONE: 3/4 grooved axe	GROUND STONE: mano	GROUND STONE: hammerstone	GROUND STONE: abrader	Dongola-exotic chert, flake	bone	historic	TOTAL LITHICS	Diversity index[2]
Burz (1981)	6 / 6	114	7	1		5	2	3	30	55	25	3	2	1		4	5		1			144	
Burz (pre 1981)							1		93	15	73	1						1				184	
Britten	1	5	1						12	1	3					1	1					19	
Burline			4	2	3				19	5	8	1				2		1				45	
Flat Top	1	4	1		1	1			1	3	1								1			8	
Howard			5	2		2	1		41	9	8			1		1	1					71	
Hurricane Creek			2						3		4											9	
Silver Tower	3	15							2	1	1											4	
South End Shell			2						1		1											4	
S.R. Hook			2						4	1	1	1		1								10	
Sunday	14	84																	1			2	

[1]All sites contained unretouched lithic flakes and blockies. The totals are not included since unlike the other categories (all observed retouched specimens were recovered) they represent only a very small sample of what was observed at each site. Appendix A provides a qualifying statement on the distribution of unretouched lithic artifacts at each site.

[2]Since the sites located on the Burline Sandridge were surveyed prior to the present study and were collected in a different manner, a diversity index was not used for these sites. Diversity index is the total number of stone artifact types at each site divided by total number of artifact types combined from all sites.

Table 3 lists the sites alphabetically, summarizing the time periods represented and identifies whether diagnostic projectile points or ceramics were recovered. Table 4 provides a cultural chronology for the lower Illinois River valley. Table A.2 presents site environment information, the potential for buried components and represented surface cultural components. Included in this table, for comparisons, are other sites previously located within the Hartwell and Nutwood districts but outside the present survey area.

The small number of sites found, the collection of only surface material and the spatially and environmentally restricted nature of the survey does not allow for modeling temporal changes in settlement and subsistence within the lower Illinois Valley. However, the results can be used to delineate similarities and differences between sites, characterize site distributions and to provide comparisons with other Illinois River valley surveys.

Ceramic Analysis

(See Appendix D for detailed descriptions of the recovered ceramics.)

Ceramics were recovered from ten sites (43%) and along the Burline Sandridge. The majority of ceramics were either Early Woodland or Late Woodland. Middle Woodland was represented by a much smaller percentage. The largest ceramic assemblage was found at the Bullseye site, and was Early Woodland. The only site containing Early, Middle and Late Woodland material is Quasar. Two sites had two ceramic components, Half Circle and F.S. Field, representing Middle and Late Woodland. When Early Woodland ceramics were recovered it frequently was the only ceramic component represented. Middle Woodland pottery was always

Table 3. Site Time Periods based on Diagnostic Artifacts

Site Name	Archaic			Woodland					Late Woodland/ Mississippian		Mississippian	Indeterminate Woodland
	Early	Middle	Late	Early		Middle		Late				
	projectile points			PP	cer.	PP	cer.	PP cer.	PP	cer.	--- projectile points ---	
Bullseye	X	X			X							
Britten		X										X
Burline	X	X	X									
Burline Sandridge	X	X	X	X	X	X		X		X	X	X
Flat Top				X								X
Half Circle												
Hidden Ridge							X	X				
Howard		X	X									
Hurricane Creek		X				X						
Narrow Sandy		X										
Quasar	X	X			X	X	X	X				
Silver Towers		X		X	X							
South End Shell		X										
Sunday					X							
Wild Onion			X		X	X						
F.S. Field							X	X				X

Table 4

Culture Chronology

Age	Culture Group
Post A.D. 1600	Historic
A.D. 1100 - 1300	Mississippian
A.D. 450 - 1100	Late Woodland
100 B.C. - A.D. 450	Middle Woodland
800 - 100 B.C.	Early Woodland
2500 - 800 B.C.	Late Archaic
5000 - 2500 B.C.	Middle Archaic
8500 - 5000 B.C.	Early Archaic

associated with Late Woodland pottery. Given the small sample size (sites and ceramics) the significance of these associations is not yet clear. It is interesting to note that all the Early Woodland ceramics are from the Hartwell District and that most of the Middle Woodland and Late Woodland ceramics are from the Nutwood District. The implications regarding settlement distribution will be discussed later.

Early Woodland pottery is represented by Black Sand Incised, Peisker Pinched Punctate, Liverpool Plain, Liverpool cordmarked, Liverpool Series-Punctate, and one sherd exhibiting either cordmarking or fabric impression. The material was collected at five sites, Bullseye, Quasar, Wild Onion, Silver Tower and Sunday, and along the Burline Sandridge.

Middle Woodland material was recovered from three sites, two in Nutwood and one in the Hartwell District. Pike or Baehr pottery is from two sites, F.S. Field and Quasar. The material from Quasar exhibits plain rocker decoration and may be from a Hopewell vessel. A single Hopewell sherd with broad incised lines comes from F.S. Field and one Havana sherd is from Hidden Ridge.

Late Woodland material was found at three sites, F.S. Field, Hidden Ridge and Quasar, and the Burline Sandridge. F.S. Field has the largest Late Woodland collection. One sherd has exterior cordwrapped stick decoration and a node, a second exhibits plain dowel exterior lip impressions with smoothed over cordmarking along the rim. The Hidden Ridge site also has a

late Late Woodland sherd with smoothed over cordmarking. A second plain sherd is classified as Bluff pottery. The Late Woodland sherd at Quasar is quite thin with a distinctive reddish paste.

The material collected from the Burline Sandridge includes a White Hall lip/rim sherd exhibiting exterior punctates below the lip and smoothed over cordmarking, and another sherd which appears to be either an applied lug or handle. The latter sherd is either Late Woodland or Mississippian.

The ceramic assemblages from all the sites is small, with primarily only one sherd represented from each vessel. The total number of individual vessels is probably less than 30.

Lithic Analysis

(See Appendix B for lithic artifact descriptions.)

The lithic assemblages contain exclusively retouched and/or shaped tools and exotic chert. The majority of these are non-diagnostic and may represent tools used and/or manufactured during any number of prehistoric time periods. Delineating occupations and assigning artifacts to specific time periods is difficult when multiple cultural components are represented. Single component sites (diagnostic projectile points from only one time period are represented) must also be interpreted cautiously. The absence of diagnostic artifacts may result from survey conditions, prehistoric curation (Goodyear 1979, Schiffer and House 1975) and/or removal by local collectors. Field conditions and collection methods also impede interpretations. The spatial patterns produced when lithic artifacts

are introduced into the archeological record can be used to delineate activities and the areas in which they occurred. Ideal conditions require minimal spatial disturbance and collection that isolates small aggregates of tools and other artifacts. Plowing and lumbering have no doubt affected artifact spatial patterning on sites within the Hartwell and Nutwood Districts. In addition, using normal survey techniques, minimizing collecting units was not attempted unless obvious clusters were observed. All artifacts were grouped together into a single provenience represented by the site as a whole. Despite limitations on interpreting lithic artifact associations and function due to temporal and spatial mixing, the assemblages provide information on chert resource procurement, technology and settlement.

Almost all the lithic artifacts were manufactured from Burlington chert. This material is locally available and is the most common lithic resource recovered from archeological sites within the lower Illinois River drainage. Meyers (1970) assessed the chert resources from the lower Illinois River valley and concluded the Burlington chert has good knapping quality, was the most common found and was available from three sources: 1) bedrock, 2) weathered talus, and 3) redeposited stream gravels. Meyers noted the procurement of Burlington chert from stream gravels would be the easiest given availability and ease of procurement (1970:34). Since Burlington chert is ubiquitous it is not surprising that

virtually all the recovered artifacts are manufactured from this chert source. It should be noted that Burlington chert is characterized by a range of variations, sometimes similar in appearance to other chert sources. Until an extensive evaluation of Burlington chert is conducted it is possible that non-Burlington chert may have gone undetected in the assemblages. Recent studies by Wiant (in press) indicates qualitative variations in Burlington chert may be temporally significant regarding procurement, technology and tool use. The small artifact sample recovered during the present survey does not allow for a similar assessment.

Two non-Burlington lithic artifacts were recovered from two different sites. The material is Dongola chert, probably transported from sources in southern Illinois.

The sites are all characterized by a low density of surface artifacts, although variations do occur. Table 2 indicates a range of activities among the sites representing procurement, manufacturing, processing and maintenance. The most common artifacts recovered were bifaces, projectile points and unifaces. The high number of projectile points is misleading due to the quantity recovered during a sandridge collection prior to 1981.* Groundstone tools and hammerstones were recovered in far lower quantities. At two sites, Fox Pup and Levee Bend, retouched tools were not recovered.

Bifaces represented primarily the latter stages of thinning and shaping, i.e. exhibiting shallow flake scars, thin cross

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*An amateur collected this material and the focus was to recover projectile points.

sections and retouched edges. Although the proportion of unifaces is lower than bifaces, the ratio is not similar among sites. These variations are not related to overall increases in artifacts per site. Quasar has the highest number of artifacts (68) and the largest ratio of unifaces to bifaces (1 to 7). Wild Onion has the second highest artifact total (32) but shares the lowest uniface to biface ratio (1 to 2). Assuming surveyor bias and other collection limitations are constant, differences in the intensity and/or diversity of activities is implied.

A majority of bifaces are broken. In many cases they represent either tips or midsections. Although a detailed examination of the breaks has not occurred, retooling does not appear to have been a major emphasis.

The categories of unifaces and bifaces were subdivided to illustrate levels of modification, reflecting variation in time and energy expenditure. Differences in function are implied but not necessarily demonstrated. Unifaces are predominately manufactured from large flakes exhibiting only edge retouch. The edge angles are consistently within the 70°-80° range, implying use as scrapers (Wilmsen 1970). Bifaces are commonly produced by retouching the surface and edges of large pieces. The absence of flakes with only the edges bifacially retouched may result from sampling bias. Since the surveyors focused on retouched tools, large edge retouched unifacial flakes might have been more apparent than small bifacially edge retouched

flakes.

Dividing the number of chipped stone and groundstone tool categories represented at each site by the total number possible by combining all the sites, a tool diversity index was produced. As indicated in Table 2 Quasar, Wild Onion, Fallen Timber and Bullseye have the highest diversity of tool classes. Tool diversity is directly related to the number of artifacts recovered. Sites with the smallest number of artifacts also exhibit the narrowest range of tool types.

Small sample sizes for individual type categories and multiple components inhibits more formal discussion regarding expedient and curated tool techniques or specific interpretations of particular site assemblages.

Projectile point analysis is an exception to the problems inherent in small surface survey collections. These artifacts are significant chronological markers because of documented temporal changes in morphology and technology. A total of 88 projectile points were collected from 20 sites. The temporal range extends from Early Archaic to Middle Woodland (Table 5). The projectile points were examined for a series of metric and discrete variables and summarized in Appendix C. Implications regarding the distribution and association of all the lithic tools will be discussed below.

Cultural Chronology and Site Distribution

Figures 18 -- 21 illustrate site locations according to surface geomorphic landforms. Combined with the data contained in Tables 2, 3, and 5 an apparent pattern of floodplain utilization emerges reflecting variations in occupation intensity and diversity. Although similar environmental zones were surveyed at Hartwell and Nutwood, sample sizes are small and the ability to recover unbiased samples is limited. Future archeological investigations may alter these preliminary statements.

A continuous record of cultural occupation begins in the Early Archaic and extends into the Mississippian. Based on temporally diagnostic artifacts (Table 3) 31 separate cultural components are identified at 19 sites and the Burline Sandridge. Since the Burline Sandridge was collected as a single unit prior to and including the 1980-81 survey it is likely that many diagnostic items may be associated with known sites and are not included in the above total. However, two components, Late Woodland and Mississippian are not duplicated at known sandridge sites and therefore have been included.

Surprisingly, the number of Woodland components identified by ceramics exceeds that for projectile points. This is unexpected since projectile points are easier to identify on the surface during survey than ceramics. The absence of Late Woodland projectile points may be due to surveying limitations. These artifacts are generally manufactured on small flakes and may have been missed due to their size.

The Middle Archaic is represented by the largest number of diagnostic points (55) and sites (9) (Table 5). Early Woodland material is represented at six sites followed by Middle Woodland at five sites. Early Archaic, Late Archaic and Late Woodland are presented at three sites each (Table 3).

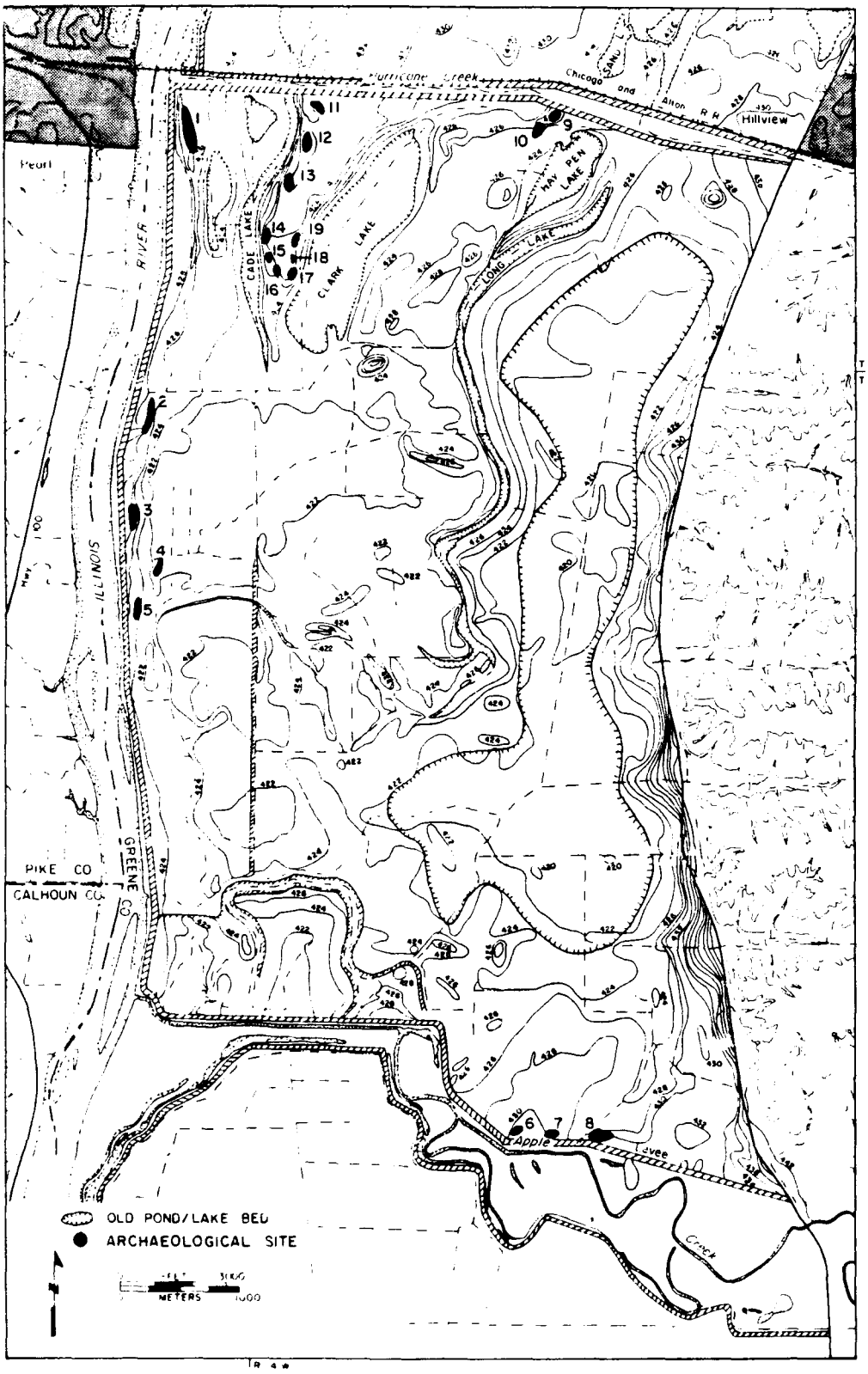

Figure 18. Topographic landforms with site locations, Hartwell District.

1. Wild Onion
2. Fallen Timber
3. Quasar
4. Bent Fork
5. Broken Horseshoe
6. Levee Bend
7. Blue Mornin
8. Half Circle
9. Bullseye
10. Narrow Sandy
11. Hurricane
12. Spitter
13. Silver Tower
14. Howard
15. South End Shell
16. Flat Top
17. Hook
18. Sunday

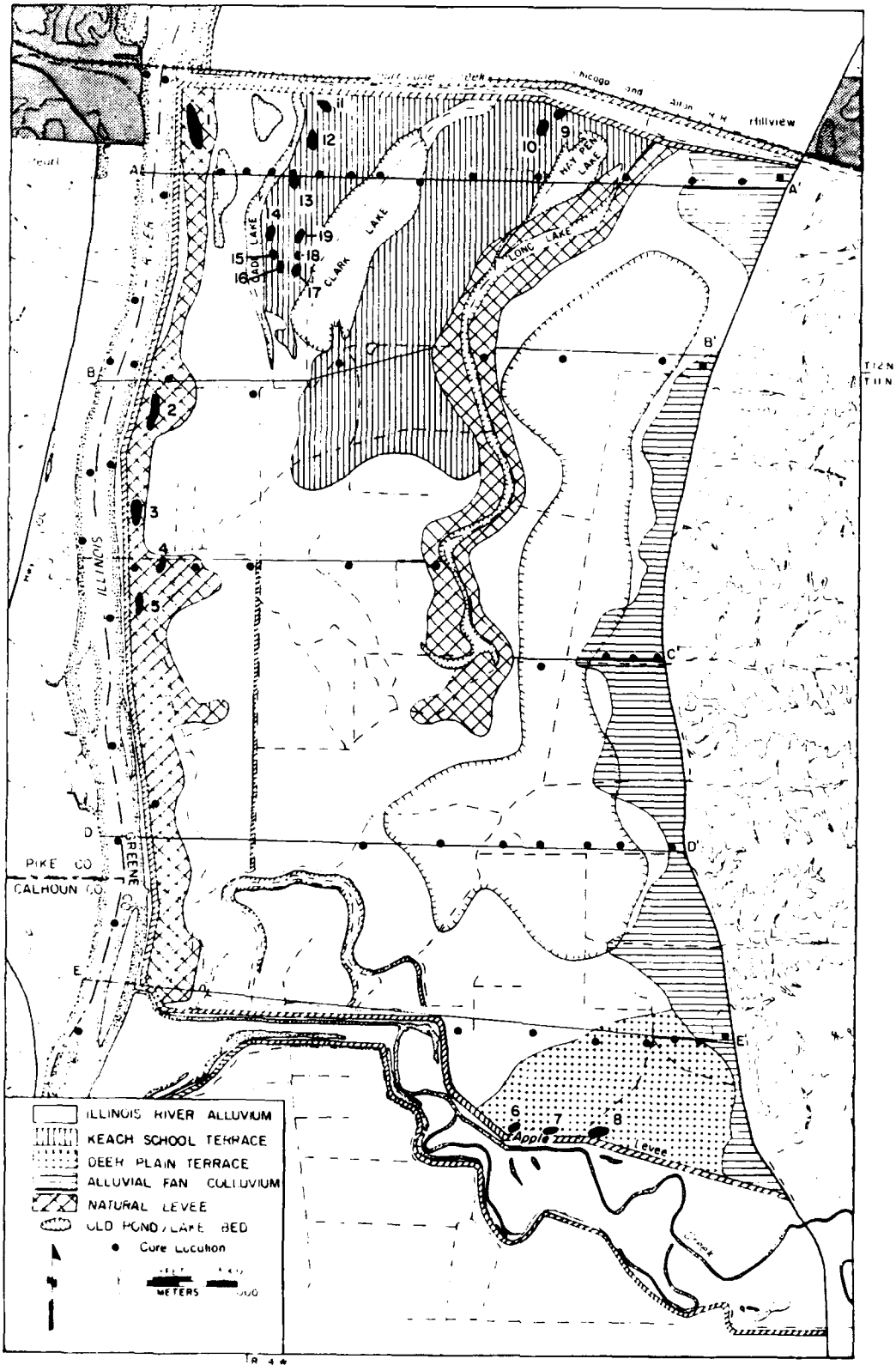

Figure 19. Geomorphic landforms with site locations, Hartwell District.

1. Wild Onion	6. Levee Bend	11. Hurricane	16. South End Shell
2. Fallen Timber	7. Blue Mornin	12. Britten	17. Flat Top
3. Quasar	8. Half Circle	13. Silver Tower	18. SR Hook
4. Bent Fork	9. Bullseye	14. Howard	19. Sunday
5. Broken Horseshoe	10. Narrow Sandy	15. Burline	

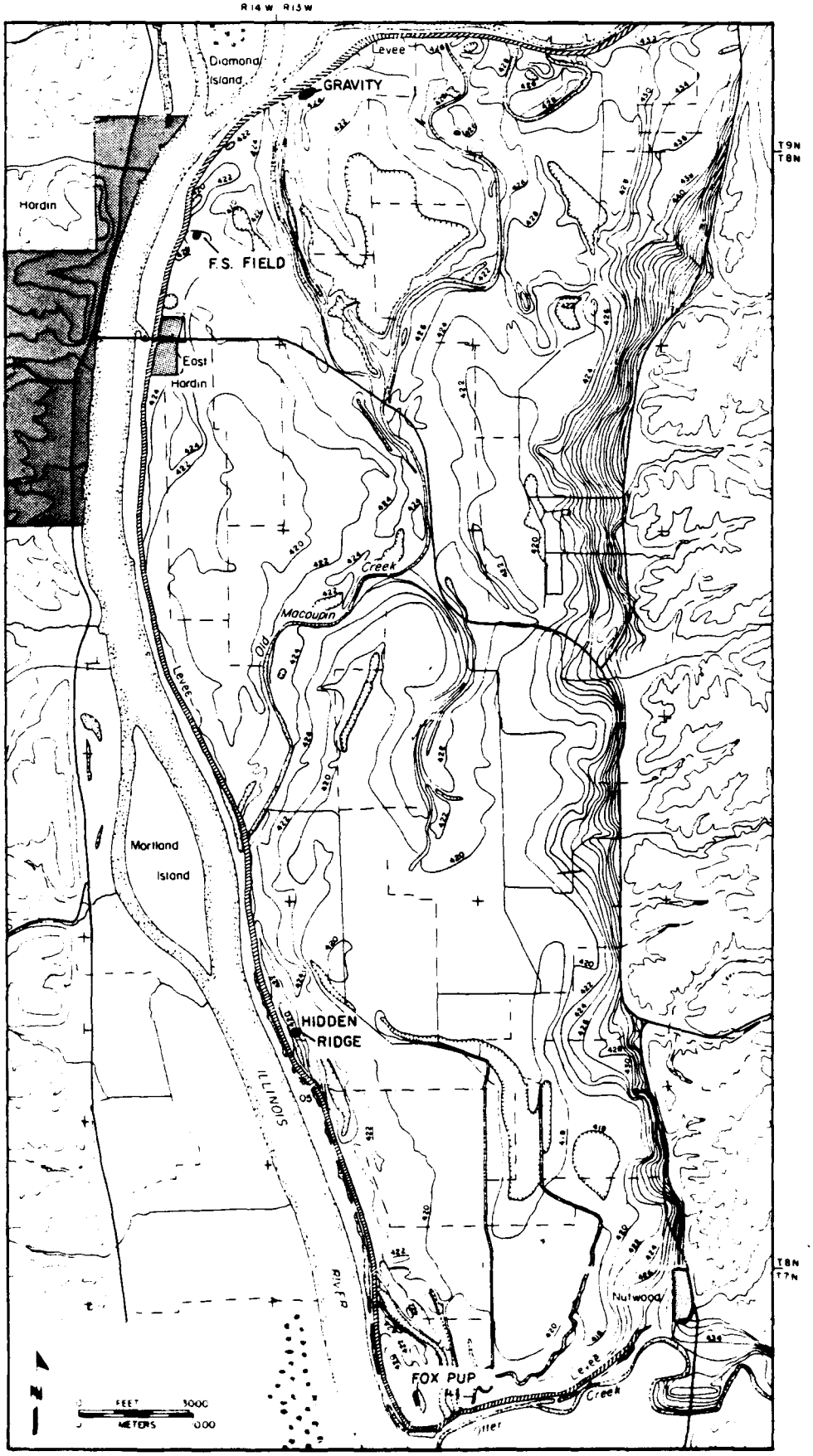

Figure 20. Topographic Site Location, Nutwood District.

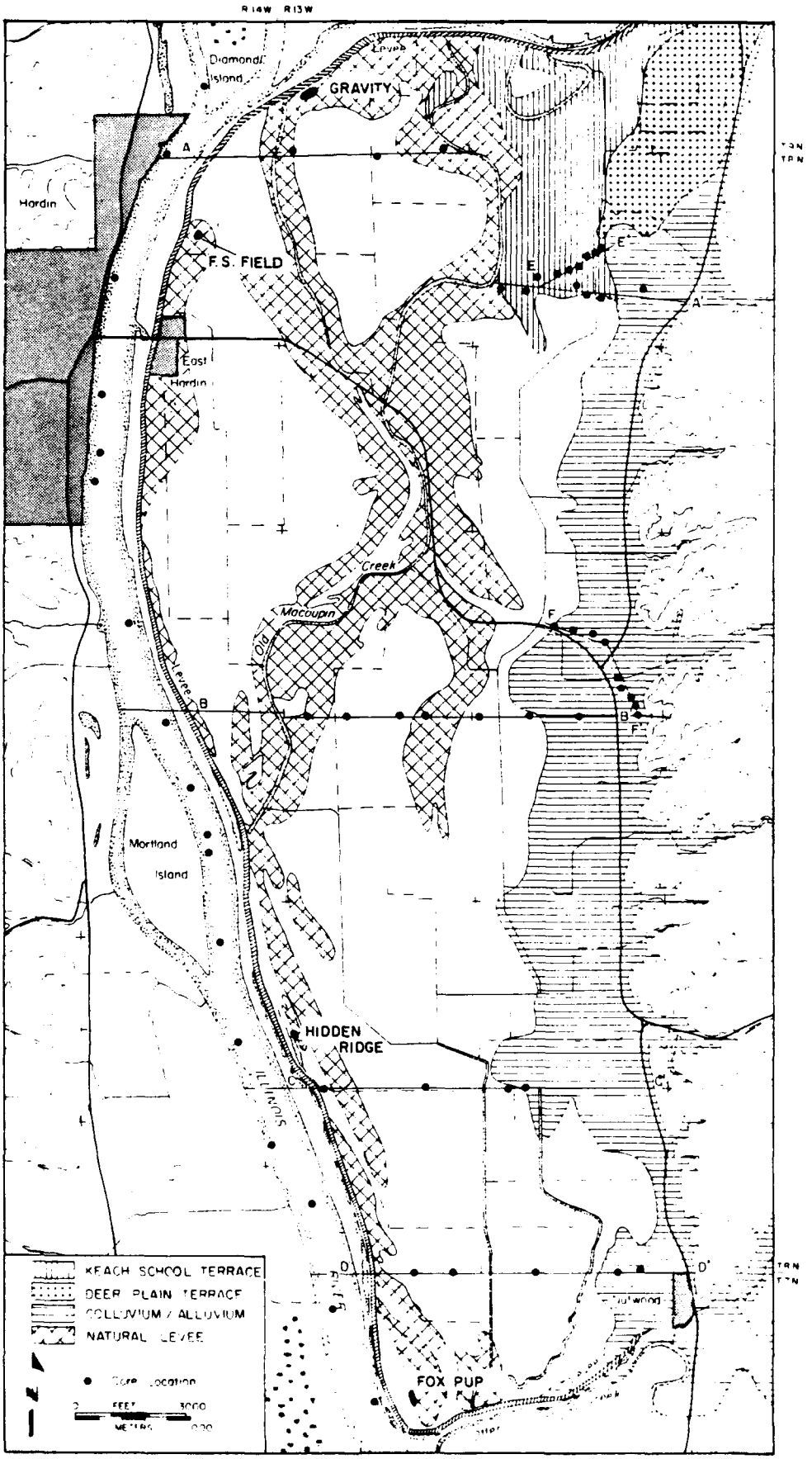

Figure 21. Geomorphic Site Location, Nutwood District.

Table 5: Representation of Cultural Components by Projectile Points

	No. of sites	ct	Burline Sandridge count	Total count
Early Archaic	3	3	3	6
Middle Archaic	9	24	31	55
Late Archaic	3	3	2	5
Early Woodland	2	3	9	12
Middle Woodland	3	4	4	8
Late Woodland	0	0	0	0
Mississippian	0	0	2	2
Total	20	37	51	88

Late Woodland and Mississippian material was also collected during the general collection along the Burline Sandridge.

Table 6 presents the distribution of components and sites by landform. During the Archaic periods the most intensely occupied landform is the Keach School Terrace. The Woodland occupations represent a shift away from the terrace onto the natural levee bordering the Illinois River. The number of sites without diagnostic artifacts is higher along the natural levee. This may reflect differences in length (and function) between sites on the Keach School Terrace and the natural levee. The longer a site is occupied the more likely curated tools will be discarded (Schiffer and House 1975; Goodyear et al. 1979). Sites located on the Keach School Terrace are exclusively single component, while all but one site on the natural levee is multicomponent. Interpreting these patterns should await their confirmation by more intensely collecting the surfaces and conducting subsurface investigations.

Table 7 documents the number of times cultural components are found in association with one another. Although the sample is small, it does indicate patterns not unexpected. Future surveys along other Illinois River levee districts and in other portions of the Hartwell and Nutwood districts are necessary to confirm whether similar settlement patterns are represented. The highest correlations of diagnostic cultural artifacts are: Early Archaic with Middle Archaic, Middle Archaic with Early Archaic and Early Woodland, Late Archaic with Middle Archaic, Early Woodland with Middle Archaic, Middle Woodland with Late Woodland and Late Woodland with Middle Woodland.

Examining Appendix A and Tables 2 and 3 the sites can be organized according to surface complexity based on the quality and quantity of archeological information contained at each site. The following data sets are used to evaluate complexity: presence of features and/or midden, presence of

Table 6: Site Distribution According to Surface Landform

	Number of Cultural Components		
	Natural Levee	Keach School Terrace	Deer Plain Terrace
Early Archaic	1	2	0
Middle Archaic	1	8	0
Late Archaic	1	2	0
Early Woodland	2	3	0
Middle Woodland	4	1	0
Late Woodland	3	1*	0
Woodland	0	1	1
Mississippian	0	1*	0
Number of Components	12	17	1
No. sites	4	10	1
No. sites without diagnostics	5	1	2
Total # sites	9	11	3
Multi Components	4	1	0
Single Components	0	5	1

*Recovered from the general collection on the Burline Sandridge and not site specific.

Table 7. Associations between Cultural Components

	EA	MA	LA	EW	MW	LW
Early Archaic	-	3	1	2	1	1
Middle Archaic	3	-	2	3	2	1
Late Archaic	1	2	-	1	1	0
Early Woodland	2	3	1	-	2	1
Middle Woodland	1	1	1	2	-	3
Late Woodland	1	1	0	1	3	-

pottery, and the quantity and diversity of tools. The issue of multicomponents complicates this assessment, thus necessitating considering the site as a whole. Based on these criteria five sites are considered the most complex: Quasar, Wild Onion, Bullseye, Fallen Timber and F.S. Field. The Quasar site has the largest tool assemblage, the greatest diversity of tool types, and a large midden. The site also contains the largest number of components, five. Wild Onion has the second largest stone tool assemblage and a tool diversity index equal to Quasar. This is interesting since Quasar has more than twice as many lithic artifacts. The presence of a hoe is noteworthy since it is the only one recovered during the survey. Bullseye has the second highest level of tool diversity and the third largest lithic assemglage. A feature is indicated by a cluster of igneous cobbles and bone. This site also has the largest ceramic assemblage, exclusively Early Woodland. Fallen Timber has no diagnostic artifacts and only 13 lithic artifacts but has the second highest tool diversity index. F.S. Field contains the largest Late Woodland ceramic assemblage and a relatively high tool diversity index. The remaining sites contain small lithic assemblages and exhibit a narrow range of diversity. It is important to recognize that site complexity is not equivalent to the importance tied to the research potential at a site. Small single component sites contain different but equally important information.

Disturbances

Chapter 4 discussed factors that may have disturbed the archeological materials. In a number of instances these factors are documented to have disturbed sites located during the 1980-81 survey.

1) Plowing and lumbering -- Figures 9 and 12 illustrate the extent that forests covered the floodplain prior to historic

cultivation. Many of the sites are located in areas that once contained trees. In addition, most of the sites are situated in cultivated fields. The combination of tree removal, flooding and plowing have no doubt effected artifact spatial patterning, the preservation of subsistence remains and probably have damaged lithic and ceramic artifacts. Two sites, Hidden Ridge and Fallen Timber had trees removed recently.

2) Levee construction -- Three sites are particularly close to the levees and may be either covered in part or have had the surfaces disturbed and/or removed during construction. The sites are: Wild Onion, Bullseye and Half Circle. Although other sites may also be effected, these sites contained material adjacent to levees and warrant mention.

3) Road construction -- Between two sites, Bent Fork and Quasar, a farm road may have disturbed surface portions of either site.

4) Buildings -- Chapter 5 discussed those areas where historic construction obscured or eliminated survey areas. This is particularly noticed at the Hartwell pumping station. Construction at these locations while preventing the areas from being surveyed, may also have disturbed or destroyed archeological sites.

5) Amateur collectors -- Collectors are familiar with many sites in both Hartwell and Nutwood. Knowledge of these sites by the professional community is due in part to the cooperation of amateurs. At least one site, a single component site located on the Keach School Terrace, is known to a collector.

Summary

The overall intent of this project is to assist the Corps of Engineers in planning future projects within the Hartwell and Nutwood levee districts. In addition, Chapter 4 discussed how the Hartwell and Nutwood surveys might contribute to the long term research intersects developed by the Center for American Archeology. The goal of that research is to document and explain evolutionary changes in settlement and subsistence patterning within the lower Illinois River drainage. The contributions of the present study toward this goal are evaluated and discussed below.

1) Improve our understanding of the distribution of sites within a particular landscape type in the region, and

2) Improve our understanding of the utilization of the wider regional landscape during specific cultural periods in the prehistory of west-central Illinois.

Numerous sites had been reported prior to the 1980-81 survey in both levee districts. The identification of many of these sites occurred not through systematic surveys but rather resulted from collector interviews and through non-systematic surveys. An example of a "nonsystematic" survey is the identification of sites in the vicinity of the Macoupin site in the Nutwood District. During the investigations at Macoupin in 1968, the surrounding area, within a limited distance, was examined for sites. Sites located through either manner certainly contribute valuable information on site distributions and culture history. Unfortunately, they also present a biased perspective of prehistoric behavior. The bias results from a focus on larger, more complex sites, an examination of a restricted geographic zone and a nonsystematic collection of artifacts. The present study does not solve all these problems. Artifact collection is more systematic and the focus is on the identification of all sites as well as 'empty' zones where surface sites are not located, but the

geographic area is still restricted.

Since the present study occurred in an interior corridor adjacent to the artificial levee, it complements the Nine Foot Channel survey (Farnsworth 1976) which occurred on the river-edge side of the levee, and sandridge surveys which have previously been undertaken in the interior floodplain. In addition, the present study focuses on a landform similar to one surveyed during the Eldred project, thus enlarging the sample size for that landform.

The results from the 1980-81 survey support patterns identified by Struever and Farnsworth for the sandridges and the river shoreline but does not mirror the results from the Eldred-Spankey survey along the natural levee. The Nine Foot CHannel and the Eldred-Spankey surveys delineated clear differences among sites regarding intensity of activities and function. The sites identified during the 1980-81 survey do not exhibit similar distinctions. Sites do exhibit quantitative and qualitative differences but multiple components and small assemblages suggest occupation of short duration and a narrow range of activities.

The Burline Sandridge (Keach School Terrace) in the northern portion of the Hartwell district contained the highest quantity and density of artifacts. The elevation of the Keach School Terrace above periodic flood levels no doubt contributed to the presence of multiple Archaic and Woodland components there. Struever(n.d.) discusses the presence of an extensive Late Archaic component for the entire sandridge. While that may be accurate, south of Hurricane Creek, Middle Archaic diagnostics occur in much higher quantities at a larger number of sites. Struever also concluded that extensive flintknapping was indicated by the presence of prepared nodules and related debris. Cores were not recovered during the 1980-81 survey but a large quantity of broken bifaces were recovered as well as a number of hammerstones. According to

Struever (n.d.) and Farnsworth (n.d.), Middle Woodland ceramics were rare along the sandridge and the density of Early Woodland ceramics was low. During the 1980-81 survey, Middle Woodland ceramics were not found along the Burline Sandridge and Early Woodland ceramics were recovered in small quantities except at the Bullseye site.

The Nine Foot Channel survey indicated that the quantity and diversity of sites peaks during the Middle Woodland periods. The present study illustrates that Middle Woodland ceramics are rare on the natural levee and the Pleistocene terraces. The Eldred-Spankey survey identified a number of Late Archaic sites along the natural levee. In contrast, only two Late Archaic components were identified in 1980-81 and both of these sites are situated in the Nutwood district.

The archeology of the Nutwood district interior floodplain is better known than the interior of the Hartwell district. Excavations at the Macoupin site, surveys in the vicinity of the Macoupin site, and collector interviews have identified large, complex Early and Middle Woodland occupations near old Macoupin Creek. In contrast, the Nutwood survey identified sites that are smaller and less complex. The most intensive occupation appears to be the Late Woodland component at F. S. Field.

The Hartwell and Nutwood surveys were undertaken in similar ecological settings, but environmental differences exist between the two project areas.

The Hartwell district is characterized by a wider and higher elevated floodplain, less prone to seasonal flooding. Its natural levees provide a continuous border along the Illinois River. Two backwater lakes are present; one is particularly large (Grassy Lake). An abandoned creek channel meanders north-south through most of the district, and both the Keach School and Deer Plain terraces outcrop prominently, particularly in the northern section.

A strong correlation exists between landforms and archeological site locations. Archaic components, particularly those dating to the Middle Archaic, are most common. These sites are situated almost exclusively on the pleistocene terraces. Middle and Late Woodland artifacts are rare. Early Woodland material is well-represented, but only at one site on the Keach School Terrace.

In contrast, the Nutwood district has a narrower floodplain, particularly in the southern end that is lower in elevation and more susceptible to flooding. Its natural levees bordering the Illinois River are discontinuous. Backwater lakes, though present, are much smaller than Grassy Lake. Old Macoupin Creek and its accompanying natural levees are the focal environmental feature of the district's interior floodplain. Both the Keach School and Deer Plain terraces are less prominant than in the Hartwell District. Also, the recovered archeological materials reflect less complex sites than those found in the Hartwell district. Moreover, only four sites were identified, all situated on the natural levee. Two of these sites did not contain diagnostic artifacts. The others have yielded only Middle and Late Woodland diagnostics. This scarcity of sites, combined with the relatively low elevation of most Nutwood district floodplain areas, hints that frequent flooding may have buried many Archaic and earlier Woodland period archeological sites here.

3) Improve our understanding of the nature and distribution of small limited activity sites across the landscape.

Prior to the 1980-81 survey, knowledge of prehistoric occupations in the Hartwell and Nutwood districts was based on the Nine Foot Channel survey (two sites) and Burline Sandridge surveys (nine sites). A few additional sites had been recorded as the result of small non-systematic surveys and interviews

with amateur collectors. As a result, ideas on archeological settlement patterns were biased. They emphasized: 1) large, complex sites, 2) settlements away from the Illinois River favoring interior areas adjacent to either backwater lakes, or old river and stream beds, and 3) Woodland rather than Archaic occupations.

The 1980-81 survey was designed to locate all sites within the corridor adjacent to the artificial levee, and to collect a wide range of archeological material. Most of the identified sites are small and exhibit a relatively narrow range of lithic tools and other artifacts.

Diversity in the artifact assemblages varies among sites but multiple components hamper determination of the contemporaniety of artifacts within assemblages. Although site assemblages are complex, they may represent accumulated artifacts from less complex but varied activities. Since the site assemblages are relatively small, it appears the occupations are probably characterized by limit activities.

None of the sites identified during the present study exhibit the size or apparent complexity of previously-known floodplain sites. However, a final determination on the complexity of the sites identified during the Hartwell and Nutwood survey must await additional archeological investigations. It appears that most of these sites reflect a narrow range of activities, and were occupied for only short periods by small groups of individuals. It is particularly interesting that these sites represent many different prehistoric time periods and cultural phases. Further analysis would provide an opportunity to examine the evolving nature of small special-activity camps within the Illinois valley trench environment.

4) Improve upon existing models regarding Holocene floodplain evolution and the potential for encountering surface and buried sites.

In 1980 and 1981 a series of shallow subsurface geologic and geomorphic investigations were conducted at the Eldred-Spankey, Hartwell and Nutwood Levee and Drainage Districts. Soil coring was conducted in a series of transects by Edwin Hajic (1980, 1981a,b), who evaluated the potential for encountering buried archeological deposits in specific floodplain settings. The highest potential exists in low energy environments where rapid sediment deposition can occur: for instance, the natural levees adjacent to the Illinois River and the tributary streams. Low potential areas include locales too wet for human occupation due to seasonal flooding; primarily lowlying interior floodplain zones. It is important to consider that isolated high areas may contain subsurface archeological material. Outcropping terminal Pleistocene Keach School and Deer Plain terraces represent areas having no potential for buried cultural components. On these surfaces material as early as the Paleo-Indian period might be expected.

The Hartwell and Nutwood survey substantiates the conclusions reported by Hajic. Archaic components are almost exclusively located on the Keach School terrace. On natural levees, sites contain primarily Woodland components; possibly earlier components could be buried. There is however, one interesting exception. Quasar is a multicomponent site with the earliest material dating from the Early Archaic period. Association of this site with the natural levee is not based on direct evidence obtained from soil coring. Instead, aerial photographs and soil maps indicate the site may rest atop the natural levee. The recovery of cultural material dating to a very early occupation in an environment characterized by rapid sediment deposition appears to contradict Hajic. However, the Quasar site might actually be situated atop a reworked

portion of the Keach School Terrace. Lithic artifacts recovered from the Burline Sandridge (Keach School terrace) exhibit a very distinctive surface patination. This patination is absent from most of the lithics found at the other sites identified during the 1980-81 survey. The Quasar site is an exception. Many of the lithic artifacts from this site exhibit a similar patination. Also, examination of the topographic maps indicates that a portion of the Quasar site is at the same elevation recorded for other Keach School Terrace sites (Table A.2). Thus, it is possible the early components at Quasar might be atop the reworked Keach School Terrace while later Woodland components are on the natural levee. Until detailed archeological and geological investigations occur at Quasar this issue cannot be resolved. Two other sites (Wild Onion and Fallen Timber) may also be on reworked portions of the Keach School Terrace rather than the natural levee.

In contrast to the Eldred-Spankey survey, the present study identified sites no earlier than the Middle Woodland period adjacent to the Illinois River (excluding Quasar and Wild Onion). Since earlier components may be buried, the present study does not provide adequate information to determine when the Illinois River stabilized into the present channel.

CHAPTER 7

Recommendations

The Hartwell and Nutwood Levee and Drainage District surveys were designed to identify the presence of surface prehistoric and early historic habitation and mortuary sites. Variable ground conditions necessitated using both pedestrian reconnaissance and shovel testing techniques. When evaluating the survey results, it is critical to recognize limitations inherent in the survey. Artifact scatters and visible artifacts on the ground surface are not necessarily accurate representations of either site size or complexity. Although plowed fields normally provide good survey conditions, the absence of rain to produce a well washed surface or the absence of disking in recently harvested fields complicate the difficult task of identifying the presence and assessing the complexity of cultural materials. The inability to secure an unobstructed view of the land surface (necessitating shovel testing) further complicates survey accuracy. On floodplains, identifying archeological sites is hampered further by rapid sediment deposition resulting in the burying of archeological material. The problem of buried archeological components will be discussed in greater detail below.

Compliance with various Federal regulations requires that once an endangered surface site is identified, additional site evaluation studies are required to determine site significance and eligibility into the National Register of Historic Places. Included among these regulations are Section 110 (a)(2), Section 106 and Section 100 (b) of the National Historic Preservation Act of 1966 (as amended 1980) and Executive Order 11593. Site evaluation studies are designed to provide: 1) more accurate determinations of site limits,

2) an assessment of subsurface preservation of fragile material remains, 3) a determination of the integrity of subsurface features and/or midden, and 4) a more comprehensive determination of antiquity of the archeological assemblage. Questions regarding within-site activities and function, and regional significance of the materials are also addressed. Activities that may be included are: 1) topographic mapping of site, 2) systematic recovery of surface materials, 3) subsurface excavation, 4) soil coring and machine trenching for profiling the sedimentary/stratigraphic sequence and mapping buried cultural materials, and 5) machine stripping of plowzone for locating undisturbed archeological features, middens and artifacts.

If additional archeological testing determines a site exhibits no significance for local, regional or national prehistory or history then additional archeological investigations are not required. If sites are determined significant, then steps are taken to document their National Register eligibility.

Presently, it is unknown whether any of the 23 sites warrant National Register consideration. Therefore, it is recommended that prior to any construction additional archeological investigations be undertaken to evaluate National Register eligibility for any site threatened by construction. In those areas void of surface archeological material, no additional archeological work is recommended.

Three cautionary notes are necessary when approaching areas where surface archeological materials are absent. First, the ability to identify the presence of archeological material from shovel testing is limited. Those areas shovel tested should be approached with care. When construction is planned for those areas, having a professional archeologist present will help ensure originally undetected material is not destroyed. Second, site boundaries based on surface

material distribution alone is tenuous. Construction should not occur near known site boundaries unless a professional archeologist is present to evaluate whether site boundaries extend beyond known site limits below the surface. Third, in the floodplain the absence of surface sites should not be interpreted as representative of the subsurface. Sediment deposition is certainly not unusual in the floodplain and as discussed in Chapter 6 may result in burying cultural materials. Consequently, those areas containing a probability of buried archeological material should always be approached with caution (see Hajic 1981a,b). Consultation with a professional archeologist will help prevent the destruction of buried archeological materials.

It should be emphasized that areas void of cultural material should, when possible, be selected for construction before areas containing cultural material. When cultural materials are absent, areas of no or low potential for buried archeological deposits should be selected before areas of high potential (see Hajic 1981a,b).

The following discussion is designed to assist the Corps of Engineers in anticipating the level of complexity that could be encountered if surface archeological deposits are disturbed.

Determining the complexity represented at a site regarding the type of work necessary to conduct a proper evaluation is different from the complexity represented in the research potential for the same site. The focus here is to discuss the level and intensity of work required to evaluate the sites.

The type of work necessary at each site will depend upon the antiquity and level of complexity represented by the archeological material. Site complexity is based on the quantity and quality of archeological information

preserved at each site. The following surface survey data sets are used to estimate site complexity: presence of features, presence of pottery, size and extent of midden, diversity and quantity of cultural artifacts and potential for buried components.

Group A:	F.S. Field	Fallen Timber
	Hidden Ridge	Quasar
	Fox Pup	Bent Fork
	Gravity	Broken Horseshoe
	Wild Onion	Bullseye
	S.E. Shell	

All these sites are located on the natural levee and have a high potential for containing buried archeological deposits. Consequently testing these sites will require the full range of field activities outlined on page 93. Bullseye and S.E. Shell are not situated on the natural levee but are included in Group A because of the complexity of their surface deposits. Bullseye has a large and diverse artifact assemblage, including the largest ceramic assemblage. There are also indications that preserved pit features may exist at the site. S.E. Shell has a shell midden that when excavated could be complex both in the depositional record represented and in the quality and diversity of artifacts recovered. The remaining Group A sites are primarily multicomponent and exhibit larger and more diverse artifact assemblages than sites in Group B. In addition, most Group A sites contain ceramic bearing Woodland components that may indicate the presence of features (storage pits and/or hearths).

Group B:	Narrow Sandy	Hurricane Creek
	Half Circle	Silver Tower
	Blue Mornin	Burline
	Levee Bend	S.R. Hook
	Howard	Britten

These sites are designated as single component or lack diagnostic artifacts. They are situated either on the Keach School or Deer Plain terraces suggesting there is no potential for buried components (except in areas where recent alluvial or colluvial deposits may have buried these surfaces). The archeological deposits seem to emphasize Archaic rather than Woodland components, thus pit features should occur less frequently than at Group A sites.

In summary, the extent and intensity of work necessary to evaluate sites in groups A and B will be different. Multicomponent sites yielding larger and more diverse artifact assemblages and situated in areas requiring deep subsurface archeological and geologic evaluations will require a fuller range of testing procedures and a greater amount of field and laboratory evaluation time. More sophisticated sampling strategies must be used, a greater range of material and structural remains must be evaluated and there is a greater reliance on hand excavations.

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APPENDIX A

Site Descriptions

TABLE A.1

Legal Site Location

I.A.S. No.	Site Name	Legal Location	UTM Co-ordinate
Jy-141	Fox Pup	NW¼,NW¼,SW¼,SE¼; Sec. 6, T7N,R13W	708,940mE; 4,328,100mN
Ge-143	F.S. Field	NW¼,SW¼,NE¼/SW¼,SW¼, NE¼;Sec.1,T8N,R14W	706,860mE; 4,338,090mN
Ge-142	Gravity	SE¼,NW¼,SW¼; Sec. 31, T9N,R13W	707,800mE; 4,339,240mN
Jy-142	Hidden Ridge	NW¼,SW¼,SW¼, Sec. 30, T8N, R13W	708,040mE; 4,330,840mN
Ge-121	Bent Fork	NE¼,NE¼,NW¼; Sec. 12,T11N, R14W	705,650mE; 4,365,850mN
Ge-86	Blue Mornin	NE¼,NW¼,NE¼; Sec. 29, T11N, R13W	709,340mE; 4,361,090mN
Ge-69	Britten	SW¼,NE¼,SW¼/NE¼,SW¼, SW¼,Sec.30,T12N,R13W	706,840mE; 4,369,600mN
Ge-126	Broken Horseshoe	NW¼,SE¼,NW¼; Sec. 12, T11N, R14W	705,500mE; 4365,350mN
Ge-127	Bullseye	NW¼,NW¼,SE¼/NE¼,NE¼, SW¼;Sec.29,T12N,R13W	708,900mE; 4,369,820mN
Ge-128	Burline	NW¼,SW¼,NW¼; Sec. 31, T12N, R13W	706,540mE; 4,368,660mN
Ge-129	Fallen Timber	SE¼,NE¼,NW¼/NE¼,SE¼, NW¼;Sec.1,T11N,R14W	705,550mE; 4,367,150mN
Ge-130	Flat Top	NE¼,NW¼,SW¼; Sec. 31, T12N, R13W	706,760mE; 4,368,300mN
Ge-131	Half Circle	NW¼,NE¼,NE¼; Sec. 29, T11N, R13W	709,620mE; 4361,080mN
Ge-132	Howard	SW¼,NW¼,NW¼; Sec. 31, T12N, R13W	706,560mE; 4,368,900mN
Ge-133	Hurricane Creek	NW¼,NE¼,SW¼; Sec. 30, T12N, R13W	706,880mE; 4,369,880mN

Table A.1 (continued)

I.A.S. No.	Site Name	Legal Location	UTM Co-ordinate
Ge-134	Levee Bend	NE¼,NE¼,NW¼; Sec. 29, T11N, R13W	708,950mE; 4,361,100mN
Ge-135	Narrow Sandy	SE¼,NE¼,SW¼; Sec. 29, T12N, R13W	708,860mE; 4,369,780mN
Ge-136	Quasar	W½,SE¼,SW¼/SW¼,NE¼, SW¼,Sec.1,T11N,R14W	705,520mE; 4,366,300mN
Ge-137	Silver Towers	SE¼,SW¼,SW¼; Sec. 30, T12N, R13W	706,700mE; 4,369,240mN
Ge-138	South End Shell	SW¼,SW¼,NW¼; Sec. 31, T12N, R13W	706,560mE; 4,368,400mN
Ge-139	S. R. Hook	SW¼,NE¼,NW¼; Sec. 31, T12N, R13W	706,920mE; 4,368,780mN
Ge-140	Sunday	NE¼,NE¼,NW¼; Sec. 31, T12N, R13W	707,140mE; 4,369,100mN
Ge-141	Wild Onion	E½,W½,SE¼; Sec. 25, NE¼,NW¼,NE¼; Sec. 36, T12N, R14W	705,910mE; 4,369,480mN

Table A.2 Site Environment.

Site	Landform	Elevation	Soil		Vegetation	Buried Potential	Cultural Component
			Soil series	Texture			
Bent Fork	natural levee Illinois River shoreline	129.8	Petrolia (288)	silty clay loam	forest	high	
Broken Horseshoe	natural levee Illinois River shoreline	129.8	Petrolia (288)	silty clay loam	forest	high	
Fallen Timber	natural levee Illinois River shoreline	129.8 - 130.5	Petrolia (288)	silty clay loam	forest	high	
Quasar	natural levee Illinois River shoreline	129.8- 130.5	Petrolia (288)	silty clay loam	forest	high	Early Archaic, Middle Arch., Early Woodland, Middle Wood.,
Wild Onion	natural levee Illinois River shoreline	130.5	Petrolia (288)	silty clay loam	forest	high	Late Arch., Early Wood., Middle Wood.
Long Lake	natural levee Illinois River shoreline	129.8- 130.5	Petrolia (288)	silty clay loam	forest	high	Early Wood., Middle Wood.
Gravity	natural levee junction of Macoupin Creek and Illinois River shoreline	129.2	Petrolia (288)	silty clay loam	forest	high	
F.S. Field	natural levee Illinois River shoreline	129.2	Petrolia (288)	silty clay loam	forest	high	Middle Wood., Late Wood.

Site	Landform	Elevation	Soil		Vegetation	Buried Potential	Cultural Component
			Soil series	Texture			
Hidden Ridge	natural levee Illinois River shoreline	128.6	Tice (284) Beaucoup (70)	silty clay loam silty clay loam	forest	high	Middle Wood., Late Wood.
Fox Pup	natural levee Illinois River shoreline near old river channel	128.0 - 128.6	Tice (284)	silty clay loam	forest	high	
Whiteside	natural levee east of old Macoupin Creek	129.8	Tice (284)	silty clay loam	forest near prairie	high	Early Wood.
Gillham	natural levee slough bank west of Macoupin Creek	129.2	Tice (284)	silty clay loam	forest	high	Early Wood.
Devening	Natural levee west of slough west of Macoupin Creek	129.2	Tice (284)	silty clay loam	forest	high	Late Wood.
Crevasse Splay	natural levee near old Macoupin Creek	129.2	Tice (284)	silty clay loam	forest	high	Late Arch.
Narrow Sandy	Keach School Terrace, south of Hurricane Creek	129.8	Bloomfield 53	fine sand	prairie	none	Middle Arch.
Britten	Keach School Terrace	131.7	LaHogue (102)	loam	prairie	none	Middle Arch.

Site	Landform	Elevation	Soil		Vegetation	Buried Potential	Cultural Component
			Soil series	Texture			
Bullseye	Keach School Terrace, south of Hurricane Creek	129.8	Bloomfield (53)	fine sand	prairie	none	Early Arch., Middle Arch., Early Wood.
Burline	Keach School Terrace	130.5	LaHogue (102)	loam	prairie	none	Early Arch., Middle Arch., Late Arch.
Flat Top	Keach School Terrace	130.5	LaHogue (102)	loam	prairie	none	Woodland
Howard	Keach School Terrace	131.1	LaHogue (102)	loam	prairie	none	Middle Arch., Late Arch.
Hurricane Creek	Keach School Terrace	131.7	LaHogue (102)	loam	prairie	none	Middle Arch., Middle Wood.
Silver Towers	Keach School Terrace	131.1	LaHogue (102)	loam	prairie	none	Middle Arch., Early Wood.
South End Shell	Keach School Terrace	130.5	LaHogue (102)	loam	prairie	none	Middle Arch.
S.R. Hook	Keach School Terrace	130.5	LaHogue (102)	loam	prairie	none	
Sunday	Keach School Terrace	130.5	LaHogue (102)	loam	prairie	none	Early Woodland
Summersault	Keach School Terrace east of old Macoupin Creek	130.5	Beardstown (188) Tice (284)	loam silty clay loam	forest near prairie	none	

Site	Landform	Elevation	Soil		Vegetation	Buried Potential	Cultural Component
			Soil series	Texture			
Macoupin	Keach School Terrace east shore of old Macoupin Creek	129.8	Beardstown (188) Alvin (130 Wabash (83)	loam fine sandy silty clay	forest near prairie	none	
DeVerger	Keach School Terrace east of old Macoupin Creek	130.5	Dupo (180)	silt loam	forest near prairie	none	
Blue Mornin	Deer Plain Terrace Apple Creek near bluff	130.5	Wakeland (333)	silt loam	prairie	none	
Half Circle	Deer Plain Terrace Apple Creek near bluff	130.5	Wakeland (333)	silt loam	prairie	none	Woodland
Levee Bend	Deer Plain Terrace Apple Creek near bluff	130.5	Wakeland (333)	silt loam	prairie	none	
Jennings	Alluvium/colluvium at the bluff base near Apple Creek	134.7	Worthen (37)	silt loam	forest near prairie	high	
Wear	Alluvium/colluvium at the bluff base	131.1	Lawson (451)	silt loam	forest	high	
Richwood	Alluvium/colluvium on a sandy ridge at bluff base	131.1	Jules (28)	silt loam	forest	high	Late Wood.

Site	Landform	Elevation	Soil		Vegetation	Buried Potential	Cultural Component
			Soil series	Texture			
Blackbird	Alluvial fan at embrouchure of Shaw Hollow	131.1	Jules (28) Beardstown (188) Tice (284)	silt loam loam silty clay loam	forest	high	Middle Late Wood.
Big Bend	Floodplain where Apple Creek joins Illinois River	129.2	Wakeland (333)	silt loam	forest near prairie	low	Early Wood., Late Wood.
Brushy	Floodplain low ridge	129.8	Beaucoup (70)	silty clay loam	forest near prairie	low	Early Wood., Late Wood.
Cheney	Floodplain ridge (possibly reworked Keach School Terrace)	129.5	Bloomfield (53)	fine sand	prairie	low	Middle Arch.

Each of the archeological sites identified during the levee surveys is described below. The information presented includes: 1) nature of landscape, 2) criteria for delineating sites, 3) presence of features, 4) areas of concentrated artifacts, 5) field conditions, and 6) approximate area of scatter.

Nutwood Levee District

Fox Pup (Jy-141) weeds, 120 x 90 m

Fox Pup is a small site located on a low ridge in the Illinois River floodplain near a northward bend in the levee. Only non-diagnostic lithic debris consisting primarily of chert flakes and blocky fragments were observed during the survey.

F.S. Field (Ge-143) plowed, 90 x 45 m

The F.S. Field site is located on a low ridge on a natural levee just to the east of the existing levee in the Illinois River floodplain approximately 1.25 km north of Illinois Highway 100 and the town of East Hardin. The site was initially located during a 1968 survey. Material from both the 1968 and 1981 surveys was used in the analysis.

Gravity (Ge-142) plowed, 245 x 150 m

Gravity is located near the present confluence of Macoupin Creek and the Illinois River approximately 3.75 km north of the town of East Hardin. Material collected from this site consisted of two hammerstones and one hammerstone/mano.

Hidden Ridge (Jy-142), beans, 75 x 30 m

The Hidden Ridge site is located on a low ridge or terrace approximately 38.4 to 45.7 m east of the levee base. This ridge has recently been cleared of trees. Material collected included four Late Woodland ceramic sherds and two retouched chert tools.

Devening[1]

The site is located just to the west of the old Macoupin Creek channel. Devening is on a natural levee on the west bank of that channel approximately 2 km east of the Illinois River and the Hardin Bridge. This site was located during a 1974 survey. At that time one pit was excavated and yielded Late Woodland White Hall ceramics, numerous chert flakes, burnt soil, charcoal mottling and poorly preserved bone.

DeVerger[1]

Site is located on the extinct eastern shoreline of Reddish Lake (Keach School Terrace). The site was located during a 1968 survey. Material collected during that survey consisted of non-diagnostic lithics.

Gillham[1]

This site was reported by a local collector. He indicated that the site contained a scatter of lithic and ceramic material along a 1 km section of a "slough bank" which parallels the west bank of Macoupin Creek. Numerous examples of Early Woodland projectile points and ceramics have been recovered from this site.

Macoupin[1]

This Middle Woodland site is located on a sandridge (Keach School Terrace) immediately to the east of the old Macoupin Creek channel. The site was located during a 1962 survey, revisited during a 1967 survey, and was excavated in 1968.

Richwood[1]

Site is located on bluffbase colluvium, alluvium immediately west of Illinois Highway 100 approximately 1.7 km south of the junction of Rt. 16 and 100. Site was located during a 1972 Historic Sites survey. Material collected consisted of approximately 15 Jersey Bluff ceramic sherds.

Ski Inn[1]

The site is located on the Illinois River shoreline. It was located during the 1976 Illinois River shoreline survey. Material collected during the survey indicated that the site dates to the early Late Woodland period.

Summersault[1]

Summersault is located on the Keach School Terrace west shoreline of extinct Reddish Lake between the DeVerger and Macoupin sites. The site was located during a 1968 survey.

Whiteside[1]

The site is located on a natural levee at the southwest edge of a sandridge north of Highway 16 and east of old Macoupin Creek. Site was located during a 1968 survey. Material collected included four Early Woodland ceramic sherds.

Hartwell Levee District

Bent Fork (Ge-121), corn, 150 x 60 m

The site is located on a natural levee east of the Illinois River. A continuous but light scatter of non-retouched lithics was located at the site. The only material that was collected was a unifacially retouched flake. The site is due south of the Quasar site which is also located on a portion of the discontinuous natural levee. A gravel road separates the two sites and it is possible that they may represent a single site separated by modern disturbance.

Blue Mornin (Ge-86), plowed, 90 x 45 m

The site is located in the Apple Creek floodplain immediately adjacent to the levee, approximately 3.75 km east of the Illinois River and 2.25 km west of the Hillview/ Eldred Highway. The site is in a low area between two small ridges. Material consisted of five retouched tools, igneous cobbles and recent historic debris.

Broken Horseshoe (Ge-126), corn, 180 x 45 m

Site is located immediately to the east of the existing levee. The ground surface in this area is extremely flat with no ridges visible, however, geomorphological evidence indicates that the site is located on an eroded portion of a natural levee. Material collected included several non-diagnostic retouched chipped stone tools and non-retouched debris.

Bullseye (Ge-127), plowed, 215 x 90 m

Site is located on the Keach School Terrace south of Hurricane Creek and east of Clark Lake. Site is adjacent to the levee and possible disturbance may have occurred during levee construction. Material consists primarily of non-diagnostic lithic debris although a large amount of Early Woodland Black Sand ceramics was collected. The presence of bone and igneous cobbles suggests pit features may also occur. The landowner stated a gas pipeline had been constructed which may have disturbed portions of the site.

Fallen Timber (Ge-129), plowed, 180 x 60 m

The site is located on a natural levee due east of the Illinois River. This levee runs approximately parallel to the river. There was a continuous scatter of non-retouched lithics along the entire length of the site though it was somewhat greater near the crest of the ridge. Material included a grooved axe and several retouched stone tools. Site has been disturbed by recent lumbering.

Half Circle (Ge-131), plowed, 425 x 150 m

This site is located in the floodplain adjacent to the Apple Creek levee. Construction of the levee may have partially disturbed the site.

Levee Bend (Ge-134), corn, 90 x 45 m

The site is located in the Apple Creek floodplain immediately to the north of the levee. Site is located on a very low ridge. Lithic debris density was extremely low and consisted mostly of chert flakes and blocky fragments.

Narrow Sandy (Ge-135), plowed, 60 x 15 m

The site is located on a long narrow sandridge which is part of the Keach School Terrace south of Hurricane Creek and east of Clark Lake. Due north of this site is a similar ridge on which the Bullseye site is located. Material collected included two projectile points. This site is also known to a local collector.

Quasar (Ge-136), plowed, 550 x 60 m

The site is located on a 850 meter long section of the natural levee that runs parallel to the Illinois River. There is evidence for a historic period structure at the southern end of the site. Material collected form the site included ten projectile points.

Wild Onion (Ge-141), grass, weeds, 395 x 30 m

This site is located on another section of the natural levee immediately to the south of Hurricane Creek. Partial disturbance may have occurred at the northern end of the site during construction of the levee. Material included five projectile points and two ceramic sherds. The site has an undualating surface with non-retouched lithic concentrations situated on high spots.

Brushy[1]

The site is located on the crest of a floodplain ridge adjacent to and immediately south of a loop in an old channel of Apple Creek. Material collected from this site included both Early and Late Woodland period ceramics.

Big Bend[1]

This site was reported and collected by a local collector. Material collected consisted of ceramic sherds. The site is located to the north of a swampy area to the east of the pump station in the southwest corner of the Hartwell district. Early and Late Woodland ceramics were recovered from the surface.

Jennings[1]

The Jennings site is located on an alluvial fan at the southeastern corner of the Hartwell Levee District just north of Apple Creek. This site was located during a 1973 survey. Material from the site includes Early and Late Woodland ceramics.

Long Lake[1]

This site was first recorded during a 1966 survey. The site is located on the eastern shore of Long Lake on a natural levee. Material collected included Early Woodland Black Sand ceramics and Middle Woodland ceramics and a Belknap type projectile point.

Mussell Beach[1]

The site is located on the eastern shoreline of the Illinois River. The site was located during the 1975 shoreline survey. Material collected from this site includes several Early Woodland period ceramic sherds.

Wear[1]

This site is located near the juncture of Hurricane Creek and the Hillview/Eldred Highway on an alluvial fan. One ceramic sherd and several non-diagnostic lithic materials were collected during a 1966 survey.

Cheney[1]

This site is situated north of Apple Creek atop a low sandridge. The area may represent a reworking of the Keach School Terrace.

There is a light scatter of non-retouched lithic flakes. The hafting portion of a broken projectile point was recovered. The concave base and side notching suggest it may be as early as the Middle Archaic. No pottery was observed.

Burline Sandridge

For the purpose of this report, the Burline sandridge refers to a portion of the Keach School Terrace south of the present channel of Hurricane Creek and west of the old bed of Clark Lake. During the 1981 and 1963 survey this area was collected as a single unit. While there is a continuous scatter, there are areas of debris concentration. Other surveys collected these areas of concentrations as separate sites. These site distincitons will be maintained in this report.

Britten[2] (Ge-69)

This site is located on the west side of the sandridge and south of Hurricane Creek site. The site was surveyed during a 1967 and 1969 survey. Material collected from the site includes Early Woodland Black Sand ceramics.

Burline[2] (Ge-128)

The site is located on the western edge of the sandridge immediately south of the Howard site. Material collected included eight projectile points.

Flat Top[2] (Ge-130)

Site is located at the extreme southeast corner of the sandridge. The site was initially located during a 1969 survey. Material collected included a Belknap type projectile point.

Howard[2] (Ge-132)

The site is located on the western edge of the sandridge and south of the Silver Towers site. There have been several previous surveys at this site. Material collected included ten projectile points.

Hurricane Creek[2] (Ge-133)

Site is in the northwest corner of the sandridge just south of Hurricane Creek. The site has been partially disturbed by a house and farm buildings. Material collected included four projectile points.

Silver Towers[2] (Ge-137)

The site is located on the western edge of the sandridge south of the Britten site. Site may be partially distrubed by farm buildings. Early Woodland Black Sand ceramics were found at the site.

South End Shell[2] (Ge-138)

The site is located at the southwest corner of the sandridge south of the Burline site. This site consists of a shell midden which defines the limits of the site. Outside the site boundaries, shell was almost entirely absent.

S.R. Hook[2] (Ge-139)

The site is located on the eastern edge of the sandridge to the north of the Flat Top site. Material collected from this site included a projectile point, drill, and hoe.

Sunday[2] (Ge-140)

The Sunday site is located on the east edge of the sandridge north of the S.R. Hook site. Material collected included both Early and Late Woodland ceramics.

Notes:

1. Sites located in the levee districts but outside of the survey area.

2. Sites located on the Burline Sandridge south of Hurricane Creek.

APPENDIX B

Lithic Artifact Descriptions

Descriptions for all chipped and ground stone retouched and shaped tools are presented below. Length, width and thickness measurements are recorded for only complete or nearly complete specimens. All measurements are to the nearest mm. Recorded weights are to the nearest gram. Edge angles were taken when a working edge could be confidently identified, usually restricted to steeply edge retouched unifaces and unifacially and bifacially edge retouched flakes.

Each artifact was examined for the presence of surficial and edge flaking. Surficial flaking is indicative of tool shaping and is characterized either by intersecting flake scars across a surface other than the edge or flake scarring that extends at least one-half the width of a surface. Edge flaking is indicative of edge preparation or resharpening. Grinding, crushing and edge rounding were also noted when present. Ground stone tools were examined for grinding, pecking and battering.

In addition to the above, bifacial artifacts were assigned to either the early or later stages of manufacture based on edge sinuosity, depth of flake scars, pattern of surface flaking and correlation between length, width and thickness.

Unless otherwise noted, all artifacts were manufactured from locally available Burlington cherts. The manifestation of heat treatment among the many varieties of Burlington chert remains difficult to assess subjectively. Consequently, the presence of heat treatment has been recorded only when an obvious pink luster has been observed.

During the artifact analysis, it was observed that many specimens had sustained plow damage. It is unclear at this time to what extent the presence of plow damage has had on the artifact descriptions. However, an attempt has been made to distinguish scarring resulting from machine contact and purposeful flaking by the artifact manufacturer.

Maximum length	=	Maximum length, not necessarily representing axis of symmetry.
Maximum width	=	Perpendicular to maximum length.
Thickness	=	Maximum distance perpendicular to maximum length and width.
Edge angle	=	The largest and smallest angles from worked edge were averaged.

Table 8.1 Artifact Description by Site

Provenience [Site]	Catalogue No.	Artifact Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (gr)	Edge Angle	Comments
NUTWOOD LEVEE								
[F.S. Field]								
Walkover 1	3	uniface	60	36	22	40	74°	Steep unifacial edge retouch localized at distal end of flake. Edge exhibits some crushing & flaking possibly from use.
	4	uniface				61	76°	Blocky with a concavity exhibiting unifacial edge retouch.
	5	biface				9		Pointed biface fragment with bifacial retouch. Slight edge rounding. Late stage.
	6	biface				25		Biface fragment with bifacial surficial retouch. Later stage. Pink lustrous color suggests heat treatment.
	7	uniface				26	76°	Flake with unifacial edge retouch along one lateral edge.
	8	biface				4		Laterial fragment with bifacial surficial retouch. Late stage.
Walkover 2	3	uniface				18	71°	Unifacial edge retouch on one lateral edge of flake. Glossy color suggests heat treatment.
	4	uniface				10	73-80°	Broken flake with edge retouch on convex distal edge. Edge crushing present probably due to use.
	5	uniface	97	47	17	104	56°	Unifacial edge retouch along distal end and portions of one lateral edge of large blocky fragment. Adze-like tool.
	6	biface				38		Biface fragment with bifacial surficial retouch. Late stage.
	7	biface				47		Biface fragment with bifacial surficial retouch. Early stage.
	8	biface				20		Elongated fragment with bifacial surficial retouch. Early stage.
	9	biface	54	18	10	9		Pointed biface with bifacial surficial and edge retouch. Late stage.
[Gravity]								
Walkover 1	1	hammer-stone/ pitted stone				637		Extensive localized battering at pointed end of broken quartzite cobble. Battered depression on one surface.
	2	hammer-stone	113	74	52	371		Extensive battering along lateral and distal edges.
	3	hammer-stone	55	50	28	87		Small cobble with extensive battering on entire perimeter.
[Hidden Ridge]								
Walkover 1	1	biface				8		Biface fragment with bifacial surficial edge. Late stage.
	3	exotic chert	29	30	3	3		Bifacial thinning flake of Dongola chert.
HARTWELL LEVEE								
[Bent Fork]								
Walkover 1	1	biface	48	45	15	26		Bifacial surficial retouch. Early stage.
[Blue Mornin]								
Walkover 1	1	biface	48	28	12	17		Bifacial surficial retouch. Unifacial edge retouch on broken edge. Early stage.
	2	biface				12		Bifacial surficial retouch with minimal edge retouch. Late stage.
	3	biface	47	27	13	19		Bifacial surficial and edge retouch on one lateral edge.
	4	biface				26	52°	Bifacial edge retouch on flake.
	5	uniface				55	84°	Steep unifacial edge retouch with crushing probably resulting from use.

Table B.1 (Page 2)

Provenience [Site]	Catalogue No.	Artifact Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (gr)	Edge Angle	Comments
[Broken Horseshoe]								
Walkover 1	1	biface	56	40	10	23		Bifacial surficial flakes. Minimal unifacial edge retouch on one lateral. Late stage.
	2	biface	91	51	21	108		Bifacial surficial retouch. Early stage.
	3	uniface	76	48	17	71	75°	Steeply retouched large flake. Distal end exhibits some crushing possibly due to use.
Walkover 2	1	biface				78		Bifacial surficial retouch. Broken reworked with steep unifacial retouch. Late stage.
	2	biface	83	43	21	75		Bifacial surficial retouch. Minimal unifacial edge retouch and rounding on both laterals (same surface). Late stage.
	3	uniface				59	65°	Unifacial surficial flaking on large flake. Retouch on both laterals forming small projection at intersection.
[Fallen Timber]								
Walkover 1	1	hammer-stone				241		Broken quartzite cobble with some battering on pointed end.
	2	grooved axe				1882		Broken at groove but apparently 3/4 grooved. Igneous (?) material.
	3	drill				13		Tip broken. Bifacial and edge retouch. Convex base exhibits grinding possibly to facilitate hafting. Late stage.
[Fallen Timber]								
Walkover 2	1	drill				9		Tip and portion of eared base missing. Bifacial surficial and edge retouch. Later stage.
	2	biface				84		Bifacial surficial flaking with bifacial edge retouch. Late stage.
	3	biface				44		Midsection exhibiting bifacial surficial retouch. Lateral edge obliterated by transverse break.
	4	biface	47	25	12	16		Bifacial surficial flaking. Break on lateral edge is unifacially reworked. Late stage.
	5	biface				33		Lateral edge broken. Bifacial surficial flaking. Early stage.
	6	uniface				41	49/ 63°	Minimal unifacial edge retouch on both laterals of flake.
	7	biface				18		Bifacial edge retouch on broken piece.
	8	uniface	86	47	20	99		Unifacial surficial retouch on large flake. Unifacial edge retouch around entire perimeter. Use wear (rounding with slight polish) on distal end.
	9	uniface	86	34	20	54		Unifacial edge retouch on one lateral edge of blocky piece. Crushing on convex working edge probably due to use.
	10	hammer-stone				73		Extensive battering around most of perimeter. Piece appears to have been either biface or core before use as hammer.
[Half Circle]								
Walkover 1	2	uniface	41	24	11	11	76°	Steep unifacial edge retouch at distal end of flake. Some crushing probably due to use. Almost entire perimeter is retouched.
	3	uniface	46	36	12	21	76°	Steep unifacial edge retouch on lateral of flake.
	4	biface				27		Bifacial surficial flaking. early stage.
	5	biface	70	49	20	67		Bifacial surficial retouch. Edge retouch is unifacial at base and bifacial on lateral edges. Early stage.
	6	biface	74	58	32	139		Random bifacial edge retouch on irregular blocky piece.

Table B.1 (Page 3)

Provenience [Site]	Catalogue No.	Artifact Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (gr)	Edge Angle	Comments
	7	biface				53		Irregular bifacial surficial flaking on heavily patinated tabular piece. Initial stage.
[Narrow Sandy]								
Walkover 1	3	biface				52		Bifacial surficial and edge retouch. Late stage.
	7	uniface	65	33	10	24		Unifacial surficial flaking with bifacial edge retouch.
	5	biface				10		Lateral fragment with bifacial surficial and edge retouch. Late stage.
	6	biface				7		Midsection with bifacial surficial and edge retouch. Late stage.
	7	biface				48		Bifacial surficial retouch. Late stage.
	8	biface	82	54	24	103		Minimal bifacial surficial flaking. Early stage.
[Quasar]								
Walkover 1	3	biface				33		Pointed fragment with bifacial surficial retouch. Minimal bifacial edge retouch on one lateral with unifacial edge retouch on opposite. Late stage.
	4	biface				14		Fragment with bifacial surficial and minimal edge retouch. Late stage.
	5	biface				47		Midsection with bifacial surficial and edge retouch. Late stage.
	6	biface				26		Midsection with bifacial surficial and edge retouch on lateral only. Late stage.
	7	biface				10		Fragment with bifacial surficial flaking. Small edge area has bifacial edge retouch. Late stage.
	8	biface				30		Midsection with bifacial surficial retouch. Minimal unifacial edge retouch. Late stage.
	9	biface				12		Pointed bifacial fragment with bifacial surficial flaking. One edge has bifacial edge retouch. Late stage.
	10	biface				2		Very small fragment with apparent bifacial surficial flaking.
	11	biface	72	43	19	63		Bifacial surficial retouch with minimal bifacial edge retouch. Localized areas of grinding. Late stage.
	12	biface				59		Bifacial surficial flaking. Irregular edge retouch. Possibly heat treated suggested by glossy pink color. Late stage.
	13	biface				98		Bifacial surficial flaking with bifacial edge retouch on one lateral. Late stage.
	14	biface				17		Bifacial surficial and edge retouch. Late stage.
	15	hammerstone/ pitted stone				430		Broken quartzite cobble with localized battering at one end. Evidence for pitting.
	16	abrader	47	35	24	56		Small sandstone nodule with one small probably cultural groove.
	17	uniface	46	53	14	35	34-46°	Unifacial surficial flaking with bifacial edge retouch on both laterals of flake.
	18	biface				16		Pointed biface fragment. Bifacial surficial and edge retouch except for small edge area with only unifacial. Late stage.
	19	biface	69	47	18	57		Irregular bifacial surficial flaking. Early stage.
	20	biface	86	45	21	88		Minimal bifacial surficial flaking. Early stage.
	21	biface				9		Bifacial surficial flaking. Late stage.

Table B.1 (Page 4)

Provenience [Site]	Catalogue No.	Artifact Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (gr)	Edge Angle	Comments
	22	biface				150		Large thick piece with bifacial surficial retouch. One edge has minimal unifacial retouch. Early stage.
Walkover 2	1	hammer-stone				54		Extensive battering around entire perimeter. May have been biface before use as hammer.
	2	uniface	48	31	15	20	87°	Flake with steep unifacial retouch on distal edge.
	3	biface				52		Bifacial surficial retouch. Early stage.
	4	biface				22		Bifacial surficial and edge retouch. Late stage.
	5	biface				60		Bifacial surficial retouch. Unifacial edge retouch along unbroken edge. Late stage.
	6	biface				11		Bifacial surficial flaking. Unifacial edge retouch on both laterals (same face). Late stage.
	7	biface				42		Midsection with bifacial surficial and edge retouch. Late stage.
Walkover 3	9	drill				2		Base broken. Minimal bifacial surficial flaking. Late stage.
	10	drill				6		Small portion of base missing. Bifacial surficial flaking. Late stage.
	11	drill				4		Bifacial surficial flaking. Probable drill bit. Late stage.
	13	biface				10		Pointed biface fragment with bifacial surficial and edge retouch. Late stage.
	14	biface				13		Pointed biface fragment with bifacial surficial and edge retouch. Late stage.
	15	biface				26		Fragment with bifacial surficial flaking and irregular bifacial edge retouch. Late stage.
	16	biface				12		Pointed biface fragment with bifacial surficial flaking. One lateral has bifacial edge retouch, the other unifacial. Late stage.
	17	biface				9		Pointed biface tip with bifacial surficial and edge retouch. Late stage.
	18	biface				18		Pointed biface fragment with bifacial surficial and edge retouch. Late stage.
	19	biface				26		Midsection with bifacial surficial flaking. Bifacial edge retouch on one lateral. Opposite lateral is heavily ground. Late stage.
	20	biface				17		Bifacial surficial and edge retouch. Late stage.
	21	biface				15		Bifacial surficial flaking. Piece exhibits potlidding effect of extreme heat. Early stage.
	22	uniface	64	34	15	34		Unifacial surficial flaking with unifacial edge retouch on majority of perimeter. Small edge has bifacial retouch.
	23	biface				93		Midsection with bifacial surficial flaking. Early stage.
	24	biface	89	50	28	145		Bifacial surficial retouch. Early stage.
	25	biface	68	36	20	49		Bifacial surficial retouch with bifacial edge retouch on one lateral only. Early stage.
	26	biface				70		Bifacial surficial retouch with bifacial edge retouch on one lateral only. Late stage.
	27	biface				89		Bifacial surficial flaking with isolated unifacial edge retouch on one lateral edge. Early stage.
	28	biface				36		Lateral edge broken. Bifacial surficial retouch with edge rounding on unbroken lateral. Late stage.

Table 8.1 (Page 5)

Provenience [Site]	Catalogue No.	Artifact Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (gr)	Edge Angle	Comments
	29	biface				38		Bifacial surficial retouch. Early stage.
	30	biface				74		Bifacial surficial flaking with minimal unifacial edge retouch. Rounding on the lateral edge. Late stage.
	31	biface				46		Midsection, bifacial surficial retouch. Unifacial edge retouch on one lateral and bifacial on the opposite. Late stage.
	32	biface				30		Bifacial surficial and edge retouch. Late stage.
	33	biface				73		Bifacial surficial flaking. Unifacial edge retouch on unbroken edges. Late stage.
	34	biface				68	minimal	Bifacial surficial flaking with more continuous bifacial edge retouch. Late stage.
	35	biface				23		Bifacial surficial flaking with unifacial edge retouch on unbroken edges. Late stage.
	36	biface				52		Bifacial surficial flaking. Break reworked unifacially. Early stage.
	37	biface				54		Bifacial surficial flaking. Early stage.
	38	biface	75	35	25	79		Bifacial surficial flaking. Early Stage.
	39	uniface				22	52/61°	Unifacial surficial flaking. Both lateral edges of flake exhibit unifacial retouch. Possible use wear present.
	40	uniface	51	48	27	51	76°	Irregular unifacial surficial flaking. Piece exhibits characteristics of burned chert.
	41	biface	54	46	12	31		Minimal bifacial surficial flaking with unifacial edge retouch on portion of one lateral. Early stage.
[Bullseye]								
Walkover 1	1	hammerstone				98		Battering around perimeter of chert cobble.
	7	uniface				8	48°	Unifacial edge retouch on broken flake. Small area of use wear polish on working edge.
	8	drill	68	53	26	52		Bifacial surficial retouch. Unifacial edge retouch on lateral edges of bit.
	9	biface				51		Large irregular bifacial surficial flake scars. Early stage.
	10	uniface	68	47	20	49	75°	Unifacial retouch on blocky piece with surficial flaking on opposite face.
	11	biface				20		Tip of pointed biface. Bifacial surficial edge retouch. Late stage.
	12	biface				5		Tip of pointed biface. Bifacial surficial flaking with some bifacial edge retouch. Late stage.
	13	biface				3		Tip of pointed biface. Bifacial surficial retouch with unifacial edge retouch on one face. Late stage.
	14	biface				15		Tip of pointed biface. Bifacial surficial flake. Edge retouch is bifacial on one lateral and unifacial on opposite. Late stage.
	15	biface				14		Pointed biface. Bifacial surficial and edge retouch. Late stage.
	16	biface				13		Possible point base. Bifacial surficial and edge retouch. Late stage.
	17	biface	60	47	18	63		Bifacial surficial retouch. Late stage.
	18	biface				17		Midsection with bifacial surficial flaking and irregular bifacial edge retouch. Late stage.
	19	biface				10		Bifacial surficial flaking. Late stage.
	20	biface				13		Bifacial surficial and edge retouch. Late stage.
	21	biface				13		Midsection with bifacial surficial flaking. Late stage.

Table B.1 (Page 6)

Provenience [Site]	Catalogue No.	Artifact Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (gr)	Edge Angle	Comments
	22	biface				9		Fragment with bifacial surficial flaking. Late stage.
	23	biface	36	21	9	8		Small oval biface with bifacial surficial flaking. Late stage.
[Wild Onion]								
Walkover 1	1	hammer-stone	72	72	56	321		Extensive battering on one end of chert cobble.
	5	hoe	87	45	19	85		One-third of hoe has extensive polish on edges and both faces. Bifacial surficial and edge retouch. Edges rounded. Late stage.
	6	biface	59	42	20	56		Bifacial surficial flaking. Early stage.
	7	biface				92		Bifacial surficial flaking with rounding on both lateral edges. Late stage.
	8	biface				22		Small fragment without recognizable scar patterns.
	9	uniface	58	37	16	35	70°	Unifacial surficial flaking with unifacial edge retouch on convex lateral edge of blocky piece.
	13	biface				12		Midsection with bifacial surficial and edge retouch. Late stage.
	14	biface	60	43	14	42		Bifacial surficial flaking with minimal edge retouch. Rounding on one lateral edge. Late stage.
	15	uniface	77	44	20	71	63°	Flake with steep unifacial edge-retouch on distal and portion of adjacent lateral edges.
Walkover 2	2	biface				7		Pointed biface fragment with bifacial surficial and edge retouch. Late stage.
	3	uniface	43	28	8	13	61°	Flake with unifacial edge retouch on 3/4 of perimeter. Rounding from use wear on isolated areas of edge.
	4	uniface	47	27	±±	13	41°	Unifacial edge and surficial retouch on almost entire circumference of flake.
	6	biface				155		Bifacial surficial retouch. Early stage.
	7	biface				54		Lateral fragment with bifacial surficial flaking. Early stage.
	8	biface				143		Bifacial surficial flaking. Early stage.
	9	biface	69	39	16	40		Bifacial surficial flaking. Early stage.
	10	biface	74	52	21	70		Minimal bifacial surficial flaking. Early stage.
	12	biface				25		Pointed fragment with bifacial surficial and edge retouch. Late stage.
	13	biface				7	53°	Bifacial edge retouch only at pointed tip of fragment.
	14	uniface				14	43°	Minimal unifacial edge retouch on one lateral edge of broken flake.
	15	biface				50	68°	Two areas exhibit bifacial edge retouch on convex edges. One edge has crushing probably from use.
	16	biface				36	53°	Biface fragment reworked using bifacial edge retouch to form assymetrical bit on end.
	17	uniface	71	59	17	46	50°	Flake with unifacial edge retouch on one edge.
	18	uniface				68	65°	Steep unifacial retouch on one lateral edge of flake.
[Burline] sandridge 1981								
Walkover 1	2	biface	94	64	20	125		Bifacial surficial flaking with localized areas of bifacial edge retouch. Early stage.
	3	biface				74		Bifacial surficial flaking. Early stage.
	4	biface				119		Bifacial surficial and edge retouch forming assymetrical bit with rounding from use. Late state.
	5	biface				24		Bifacial surficial and edge retouch. Late stage.

Table 8.1 (Page 7)

Provenience [Site]	Catalogue No.	Artifact Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (gr)	Edge Angle	Comments
	6	biface				32		Bifacial surficial flaking with bifacial edge retouch at pointed tip. Late stage.
	7	biface				31		Bifacial surficial and edge retouch. Late stage.
	8	biface				13		Bifacial surficial flaking with unifacial edge retouch.
	9	biface				21		Bifacial surficial and edge retouch. One lateral edge exhibits rounding. Late stage.
	10	biface				12		Bifacial surficial and edge retouch. One lateral edge exhibits rounding. Late stage.
	11	biface				54		Bifacial surficial flaking with predominantly unifacial edge retouch. Late stage.
	12	biface				34		Bifacial surficial flaking. Late stage.
	13	biface				8		Pointed fragment. Bifacial surficial and edge retouch. Late stage.
	14	biface				26		Bifacial surficial and edge retouch. Late stage.
	15	biface				62		Bifacial surficial and edge retouch. Late stage.
	16	uniface	68	50	12	55	59°	Unifacial surficial retouch on blocky fragment. Bifacial edge retouch on majority of perimeter, remainder unifacial.
	17	biface	70	58	20	89		Bifacial surficial flaking. Chert is possibly Dongola. Early stage.
	18	biface				27		Bifacial surficial flaking. Unbroken end has small area of bifacial edge retouch. Early stage.
	19	biface	62	49	17	54	46°	Bifacial edge retouch on convex edge of flattened cobble.
	20	biface				37		Bifacial surficial and unifacial edge retouch. Late stage.
	21	biface				19		Bifacial surficial and edge retouch. Late stage.
	22	biface				17		Bifacial surficial retouch. Early stage.
	23	biface	58	28	10	18		Bifacial surficial retouch. Late stage.
	24	biface				17		Bifacial surficial and edge retouch. Some edge round present. Late stage.
	25	biface				11		Pointed biface. Bifacial surficial flaking with unifacial edge retouch. Late stage.
	26	biface				10		Bifacial surficial and edge retouch. Appears burned. Late stage.
	27	biface				17		Bifacial surficial and edge retouch. Late stage.
	28	biface				9		Bifacial surficial flaking with minimal edge retouch. Late stage.
	29	biface				11		Bifacial surficial and edge retouch. Late stage.
	30	biface	36	29	13	14		Bifacial surficial retouch. Early stage.
	31	biface				31		Bifacial surficial and edge retouch. Late stage.
	32	biface				32		Bifacial surficial and edge retouch. Late stage.
	33	biface	45	42	18	38		Bifacial surficial flaking. Early stage.
	34	graver	67	44	25	49		Bifacial edge retouch forming pointed tools with unaltered base.
	35	biface				3		Bifacial surficial and edge retouch. Late stage.
	36	biface				61		Bifacial surficial flaking. Early stage.
	37	biface				10		Fragment with bifacial surficial and edge retouch. Late stage.
	38	biface				32		Bifacial edge retouch on unbroken edges of blocky fragment.
	39	biface	40	38	14	24		Bifacial surficial retouch. Late stage.

Table 8.1 (Page 8)

Provenience [Site]	Catalogue No.	Artifact Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (gr)	Edge Angle	Comments
	40	hoe				16		Bifacial surficial flaking with unifacial edge retouch. Heavy polish on one surface.
	41	uniface	84	48	19	75	62°	Unifacial surficial flaking with irregular bifacial edge retouch.
	42	biface				34		Bifacial surficial flaking. Early stage.
	43	biface				14		Bifacial surficial and edge retouch. Late stage.
	44	biface	63	27	18	34		Bifacial surficial flaking. Late stage. Glossy pink color suggests heat treatment.
	45	biface				66		Bifacial surficial flaking. Early stage.
	46	biface				10		Pointed fragment. Bifacial surficial and edge retouch. Possible notch. Late stage.
	47	biface				31		Midsection with bifacial surficial flaking and some unifacial edge retouch. Late stage.
	48	biface				38		Bifacial surficial retouch. Early stage.
	49	biface				3		Small fragment with probable bifacial surficial and edge retouch. Late stage.
	50	biface				15		Bifacial surficial retouch. Early stage.
	51	biface				4		Bifacial surficial and edge retouch. Late stage.
	52	uniface				16	50°	Broken flake with unifacial edge. Retouch on both lateral edges.
	53	biface				25		Bifacial surficial flaking with unifacial edge retouch. Appears burned. Late stage.
	54	biface	60	32	14	29		Bifacial surficial flaking with minimal edge retouch at end. Use wear polish present here, also. Early stage.
	55	biface	41	29	8	12	36°	Flake with both lateral edges bifacially retouched.
	56	biface				44		Bifacial surficial flaking. Early stage.
	57	biface				45		Bifacial surficial flaking. Early stage. Appears burned.
	58	biface				18		Bifacial surficial flaking. Early stage.
	59	biface				28		Bifacial surficial flaking. Early stage.
	60	biface	55	39	18	43		Bifacial surficial flaking. Early stage.
	61	biface				16		Bifacial surficial and irregular bifacial edge retouch. Early stage.
	62	biface				7		Small lateral fragment. Probable bifacial surficial and edge retouch. Edge rounding present at reworked projections - formed by break. Late stage.
	63	biface				18		Bifacial surficial and irregular bifacial edge retouch. Early stage.
	64	biface				22		Bifacial surficial and edge retouch. Probably heat treated indicated by lustrous pink color. Late stage.
	65	biface	81	54	25	106	62°	Bifacial edge retouch on convex distal of flake.
	66	biface				115		Bifacial surficial flaking. Early stage.
	67	biface	63	45	12	38		Bifacial surficial flaking. Early stage.
	68	biface				5		Small fragment probably has bifacial surficial and edge retouch. Late stage.
	69	biface	97	77	28	183		Bifacial surficial flaking. Early stage.
	70	uniface	96	74	34	239	61°	Unifacial surficial flaking on large piece with bifacial edge retouch.
	71	biface				100		Bifacial surficial retouch forms assymetrical edges. Early stage.
	72	uniface	39	22	9	7		Flake with unifacial retouch on distal edge. Bit shows rounding and polish probably due to use wear.
	73	uniface	68	50	14	53	79°	Flake with steep unifacial edge retouch at distal end. Crushing and rounding on working bit indicative of use.

Table B.1 (Page 9)

Provenience [Site]	Catalogue No.	Artifact Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (gr)	Edge Angle	Comments
	74	uniface	51	30	±1	22	63°	Unifacial edge retouch on lateral and convex end of flake.
	76	uniface	54	37	10	20	59°	Unifacial edge retouch on broken flake.
	89	biface				9		Pointed fragment. Bifacial surficial and edge retouch. Late stage.
	90	biface				4		Pointed fragment. Bifacial surficial flaking. Late stage.
	92	biface				3		Pointed fragment. Bifacial surficial and edge retouch. Late stage.
	79	biface				5		Pointed biface. Bifacial surficial and edge retouch. Late stage.
	99	biface				14		Pointed fragment. Bifacial surficial flaking. Lateral edges have unifacial retouch on opposite faces. Late stage.
	604	biface				7		Pointed fragment. Bifacial surficial and edge retouch. Late stage.
	606	biface				12		Bifacial surficial and edge retouch. Late stage.
	607	drill				2		Base broken. Drill bit only. Bifacial surficial retouch.
	608	drill				4		"Earred" base. Bifacial surficial retouch.
	609	drill				4		Tip broken. Bifacial surficial retouch.
	610	graver	60	38	10	18		Bifacial surficial flaking with unifacial edge retouch to form bit.
	611	biface				12		Bifacial surficial and edge retouch. Probably heat treated - pink glossy color. Late stage.
	612	biface				11		Midsection with bifacial surficial and edge retouch. Possibly drill bit. Late stage.
	613	biface				6		Midsection bifacial surficial flaking. Possible drill bit. Late stage.
	614	mano	151	107	56	1003		One ground surface with single depression. Igneous cobble.
	615	mano/ pitted stone	85	70	52	339		One face ground with pitted depression. Battered edges.
	616	mano/ pitted stone	83	75	37	343		Two faces exhibit surficial grinding with pitted depressions in the center of each face. Localized battering on edges.
	617	mano	72	66	29	184		Surficial grinding on one face of quartzite cobble. Possible battering on edge.
	618	hammer-stone	61	59	47	201		Multiple areas of battering on chert cobble. Large abundant fossils.
	619	hammer-stone	59	47	42	134		Localized areas of extensive battering on chert cobble.
	620	hammer-stone	54	49	43	147		Extensive battering around edges of chert cobble. Large number of fossils.
	621	hammer-stone	51	45	28	78		Battering around edge of chert cobble.
	622	hammer-stone	58	51	35	142		Extensive battering on perimeter of chert cobble.
Walkover 2	3	uniface				54	56°	Unifacial surficial flaking with bifacial edge retouch forming assymetrical bit (adze-like tool).
	4	uniface	92	87	34	240	74°	Large flake with steep unifacial retouch on distal edge.
	5	uniface	70	55	24	97	68°	Patinated blocky piece with steep unifacial retouch on one lateral edge.
	6	uniface	46	35	11	16	51/ 84°	Unifacial surficial and edge retouch around perimeter of flake. Distal end is steeply retouched.
	7	biface				9		Midsection with bifacial surficial retouch and unifacial edge retouch. Late stage.
	8	uniface				15		Unifacial surficial flaking. One lateral edge has bifacial retouch.

Table 8.1 (Page 10)

Provenience [Site]	Catalogue No.	Artifact Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (gr)	Edge Angle	Comments
	9	biface				10		Lateral fragment. Bifacial surficial and edge retouch. Piece exhibits "pot-lidding" commonly attributed to exposure to extreme heat. Late stage.
	10	biface	48	31	8	14		Bifacial surficial retouch. Early stage.
	11	biface	55	46	11	37		Bifacial surficial flaking with random bifacial edge retouch. Early stage.
	12	biface				11		Bifacial surficial and edge retouch. Pink color indicates heat treatment. Late stage.
	13	biface				44		Bifacial surficial retouch. Unbroken edges are rounded. Late stage.
	14	biface				48		Bifacial surficial retouch. Late stage.
	15	biface				40		Bifacial surficial retouch. Late stage.
	16	biface				22		Bifacial surficial flaking with unifacial edge retouch. Lustrous pink color suggests heat treatment. Late stage.
	17	biface				20		Bifacial surficial and edge retouch. Late stage.
	18	uniface	51	41	12	27		Unifacial surficial flaking with bifacial edge retouch.
	19	biface				26		Bifacial surficial retouch. One lateral exhibits grinding. Late stage.
	20	biface				23		Bifacial surficial and edge retouch. Pink glossy color suggests heat treatment. Late stage.
	21	biface				44		Bifacial surficial retouch. Early stage.
	22	biface				63		Bifacial edge retouch on distal edge of large flake.
	25	uniface				9	58°	Unifacially retouched falke.
	27	exotic chert				1		Tertiary flake of probable Dongola chert.
[Burz]								
Walkover 3	5	biface						Tip of pointed biface.
	6	biface				10		Bifacial surficial retouch.
	8	biface				6		Tip of pointed biface. Bifacial surficial retouch.
	10	biface				10		Bifacial surficial retouch.
	11	biface				13		Possible notch. Bifacial surficial retouch.
	15	biface				19		Tip of pointed biface. Bifacial surficial retouch.
	19	biface				31		Bifacial surficial retouch unifacial edge.
	20	biface				10		Tip section of pointed biface. Bifacial surficial retouch.
	24	biface				7		Tip portion of pointed biface. Bifacial surficial retouch.
	26	biface				17		Tip portion of pointed biface. Bifacial surficial retouch.
	29	biface				13		Bifacial surficial retouch.
	31	biface				11		Bifacial surficial retouch. Possible drill.
	32	biface				8		Bifacial surficial retouch.
	34	biface				7		Tip portion of pointed biface. Bifacial surficial retouch.
	35	biface				8		Tip portion of pointed biface. Bifacial surficial retouch.
	38	biface						Tip portion of pointed biface. Bifacial surficial retouch.
	40	biface						Bifacial surficial retouch grinding. Possible projectile point.
	43	biface				3		Tip section of pointed biface. Bifacial surficial retouch.
	46	biface				8		Bifacial surficial retouch.

Table 8.1 (Page 11)

Provenience [Site]	Catalogue No.	Artifact Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (gr)	Edge Angle	Comments
	48	Biface				35		Bifacial surficial retouch.
	49	biface				31		Bifacial surficial retouch.
	50	biface				18		Bifacial surficial retouch.
	52	biface				8		Lip portion of pointed biface; Bifacial surficial retouch.
	53	biface				8		Tip portion of pointed biface. Bifacial surficial retouch.
	57	biface				13		Midsection; bifacial surficial retouch.
	58	biface	66	30	11	28		Bifacial surficial retouch.
	59	biface				6		Tip section of pointed biface. Bifacial surficial retouch.
	60	biface				2		Tip section of pointed biface. Bifacial surficial retouch.
	61	biface				18		Midsection; bifacial surficial retouch unifacial edge retouch on opposite faces.
	62	biface				11		Midsection; bifacial surficial retouch.
	63	biface				10		Tip section of pointed biface. Bifacial surficial retouch.
	64	Biface				16		Midsection; bifacial surficial edge retouch.
	65	biface				5		Midsection; bifacial surficial retouch possible drill fragment.
	66	biface				12		Tip portion of pointed biface. Bifacial surficial retouch.
	67	biface				14		Tip portion of pointed biface. Bifacial surficial/unifacial edge retouch.
	70	biface				51		Bifacial surficial retouch.
	71	biface				8		Bifacial surficial retouch. Possible drill base.
	72	biface				3		Tip portion of pointed biface. Bifacial edge retouch.
	76	biface				5		Tip portion of pointed biface. Bifacial surficial/unifacial edge retouch.
	79	biface				16		Midsection; bifacial surficial retouch.
	81	uniface				6		Unifacial edge reotuch on broken tool.
	84	biface				10		Tip of pointed biface; bifacial surficial retouch.
	85	biface				7		Tip of pointed biface; fibacial surficial retouch.
	88	biface				11		Tip section of pointed biface; bifacial surficial retouch.
	89	biface				4		Midsection; bifacial surficial retouch.
	90	biface				8		Bifacial surficial reotuch; possible projectile point base.
	91	biface				34		Bifacial surficial retouch.
	92	biface				6		Bifacial surficial retouch; possible drill bit.
	93	biface				31		Bifacial surficial retouch.
	94	biface				23		Bifacial surficial retouch.
	95	biface				51		Bifacial surficial retouch.
	97	biface				14		Bifacial surficial retouch.
	99	biface				17		Bifacial surficial retouch.
	602	biface				7		Tip section of pointed biface; bifacial surficial retouch; unifacial edge retouch one edge.
	603	biface				16		Tip section of pointed bifaces; bifacial surficial retouch.
	604	biface				12		Bifacial surficial retouch.
	605	biface				9		Possibly base of drill. Bifacial surficial retouch.
	606	biface	46	27	8	10		Bifacail surficial retouch.
	610	biface				33		Bifacial surficail retouch. Unifacial one edge.

Table B.1 (Page 12)

Provenience [Site]	Catalogue No.	Artifact Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (gr)	Edge Angle	Comments
	611	biface				7		Bifacial surficial retouch.
	615	biface				15		Tip section of pointed biface. Bifacial surficial retouch unifacial edge retouch on one lateral edge.
	616	biface				19		One corner missing. Bifacial surficial retouch.
	620	biface				8		Shape indeterminate; bifacial surficial retouch.
	621	biface				6		Tip section of pointed biface. Bifacial surficial retouch.
	622	biface				5		Tip section of pointed biface. Bifacial surficial retouch with retouch near top.
	623	biface				8		Bifacial surficial retouch.
	624	biface				7		Bifacial surficial retouch.
	628	biface				6		Tip section of pointed biface. Bifacial surficial edge retouch.
	629	biface				4		Bifacial surficial retouch.
	634	biface				16		Tip portion of pointed biface. Bifacial surficial retouch.
	635	biface				5		Tip of pointed biface. Bifacial surficial retouch.
	636	biface				26		Bifacial surficial retouch.
	638	biface				6		Tip section of pointed biface. Bifacial surficial retouch.
	640	biface				13		Bifacial surficial retouch.
	641	biface				7		Tip of pointed biface. Bifacial surficial retouch.
	643	biface				12		Bifacial surficial retouch.
	644	biface				9		Bifacial surficial retouch.
	646	uniface				20		Unifacial surficial retouch with unifacial edge retouch on opposite faces.
	647	biface				16		Tip section of pointed biface. Bifacial surficial retouch.
	648	biface				20		Bifacial surficial retouch.
	649	biface				8		Tip section of pointed biface. Bifacial surficial retouch.
	650	biface				10		Tip portion of pointed biface. Bifacial surficial retouch.
	652	biface				7		Tip portion of pointed biface. Bifacial surficial retouch.
	653	biface				19		Bifacial surficial retouch.
	654	biface				11		Tip portion of pointed biface. Bifacial surficial edge retouch.
	657	biface				11		Tip portion of pointed biface. Bifacial surficial edge retouch.
	658	biface				12		Tip portion of pointed biface. Bifacial surficial retouch.
	659	biface				9		Tip portion of pointed biface. Bifacial surficial retouch.
	660	biface				7		Tip portion of pointed biface. Bifacial surficial retouch.
	661	biface				39		Bifacial surficial retouch.
	664	biface				8		Bifacial surficial retouch.
	666	biface				11		Bifacial surficial retouch.
	668	biface				19		Tip portion of pointed biface. Bifacial surficial and edge retouch.
	669	drill	70	40	13	33		Portion of drill base. Bifacial surficial retouch.
	670	biface				30		Bifacial surficial retouch.
	671	biface				12		Bifacial surficial retouch.
	673	biface				14		Bifacial surficial/minimum edge retouch.
	680	biface	75	41	19	64		Bifacial surficial retouch.
	681	biface	69	35	13	35		Bifacial surficial retouch.
	682	biface	77	30	18	35		Bifacial surficial retouch.

Table 8.1 (Page 13)

Provenience [Site]	Catalogue No.	Artifact Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (gr)	Edge Angle	Comments
	683	uniface	48	37	14	30		Flake with unifacial surficial edge retouch.
	684	biface				31		Bifacial surficial/unifacial edge retouch.
	685	biface	68	32	18	44		Bifacial surficial retouch.
	686	biface	98	50	20	110		Bifacial surficial retouch.
	687	biface	62	43	13	38		Bifacial surficial retouch.
	688	biface	58	32	12	24		Bifacial surficial retouch.
	689	biface	94	60	22	150		Bifacial surficial retouch.
	690	abrader	43	33	11	18		Sandstone abrader with small circular hole drilled through tool.
	691	biface				7		Bifacial surficial retouch.
	694	biface				74		Bifacial surficial retouch.
[Britten]								
Walkover 1	2	biface				24		Bifacial surficial retouch.
	3	biface				10		Midsection bifacial surficial retouch, unifacial edge retouch.
	4	biface				4		Possible drill bit; base missing. Bifacial surficial retouch.
	5	biface				9		Broken bifacial surficial retouch.
	6	biface				53		Broken; bifacial surficial retouch.
	7	biface				30		Broken; bifacial surficial retouch.
	8	biface	67	47	19	62		Biface; cortex on both faces. Bifacial surficial flaking.
	9	uniface				58		Minimal unifacial edge reouth on flake.
Walkover 2	1	mano				419		Pitted and ground on two surfaces with stria. Battering visible on ends.
	2	hammer-stone				45		Extensive battering along one end.
	3	biface				5		Tip portion of pointed biface; bifacial surficial retouch.
	4	biface				8		Bifacial surficial retouch.
	5	biface				16		Bifacial surficial retouch.
	6	biface				18		Bifacial surficial retouch. Possibly retouched.
	7	biface				40		Nearly complete; bifacial surficial retouch.
	8	biface				58		Bifacial surficial retouch.
[Burline]								
Walkover 1	1	biface				12		Bifacial surficial retouch; unifacial edge retouch.
	2	biface				25		Bifacial surficial retouch.
	3	biface				6		Pointed biface; bifacial surficial retouch.
	5	biface				17		Bifacial surficial retouch.
	6	biface				26		Bifacial surficial retouch; unifacial edge retouch one edge.
	7	biface						Bifacial surficial retouch; minimal unifacial edge retouch.
	8	biface				3		Broken; bifacial surficial retouch.
	9	uniface	80	69	14	47		Unifacial edge retouch on large flake.
	10	uniface	53	33	14	23		Minimal unifacial edge retouch on one edge.
	11	uniface	70	29	11	30	50-60°	Unifacial edge retouch along one edge.
	12	biface				14		Broken; bifacial surficial retouch; minimal unifacial edge retouch.
	13	uniface	54	41	9	13		Minimal unifacial edge retouch along portion of edge of flake.
	14	biface				12		Midsection; bifacial surficial retouch.

Table B.1 (Page 14)

Provenience [Site]	Catalogue No.	Artifact Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (gr)	Edge Angle	Comments
	15	biface				11		Bifacial surficial retouch.
	16	uniface				4		Flake with unifacial -dge retouch.
	17	biface				22		Bifacial surficial retouch.
	18	mano				1028		Mano-hammerstone; pitting on two opposite faces; battering one edge.
	19	mano				1209		Pitting on two faces.
	20	abrader				20		Sandstone abrader with grooves on two surfaces.
Walkover 2	1	biface				4		Bifacial surficial retouch; heat treated.
	2	biface				7		Bifacial surficial retouch.
	3	biface				4		Bifacial surficial retouch.
	4	biface				28		Bifacial surficial retouch.
	5	uniface				24		Flake with unifacial surficial retouch.
	6	uniface				68		Flake with unifacial surficial retouch.
	7	uniface				110		Unifacial surficial retouch.
Walkover 3	1	biface				14		Nearly complete; tip missing; appears to be notched; bifacial surficial retouch.
	2	biface				5		Tip portion of pointed biface; bifacial surficial retouch.
	3	biface				14		Bifacial surficial retouch; minimal unifacial edge retouch.
	4	drill				3		Tip missing; bifacial surficial retouch.
	5	biface				17		Bifacial surficial retouch.
	6	biface				5		Tip portion of pointed biface; bifacial surficial retouch.
	7	biface				75		Nearly complete; bifacial surficial retouch. One area not retouched due to large fossil inclusions.
	8	biface				59		Bifacial surficial retouch.
	9	biface				27		Lateral section; bifacial surficial retouch.
	10	uniface				18		Flake with unifacial edge retouch along one edge.
	11	biface				41		Bifacial surficial retouch.
[Flat Top]								
Walkover 1	1	biface				38		Bifacial surficial edge retouch.
	2	biface				3		Fragment; bifacial surficial retouch; unifacial edge retouch.
	3	biface				1		Small fragment; bifacial surficial retouch.
	4	biface				10		Bifacial surficial/unificial edge retouch.
	5	uniface				6		Unifacial surficial retouch on flake with bifacial edge retouch
	6	uniface	55	58	22	75		Unifacial surficial retouch on flake.
	7	uniface				5		Unifacial retouched flake; Dongola chert.
[Howard]								
Walkover 1	1	biface				10		Tip portion of pointed biface; bifacial surficial retouch.
	2	biface				6		Tip portion of pointed biface; bifacial surficial retouch.
	3	biface				6		Tip portion of pointed biface; bifacial surficial retouch.
	4	biface				20		Bifacial surficial retouch; minimal bifacial edge retouch.
	5	biface				20		Possibly broken; bifacial surficial retouch.
	6	hoe				19		Bifacial surficial edge retouch; heavy hoe polish.
	7	biface				66		Bifacial surficial retouch.

Table 8.1 (Page 15)

Provenience [Site]	Catalogue No.	Artifact Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (gr)	Edge Angle	Comments
	8	biface	66	35	8	26		Bifacial surficial retouch.
	9	biface				68		Bifacial surficial retouch; minimal unifacial edge retouch.
	10	biface				30		Bifacial surficial/unifacial edge retouch.
	11	biface	47	32	12	18		Bifacial surficial/unifacial edge retouch.
	12	biface	65	55	21	67		Bifacial surficial retouch.
	13	biface	45	23	10	11		Bifacial surficial retouch.
	15	biface				28		Bifacial surficial retouch.
	16	uniface	61	28	10	18		Unifacial edge retouch on flake.
	17	biface				26		Bifacial surficial retouch.
	18	biface	60	27	13	20		Bifacial surficial retouch.
	19	biface	48	41	18	36		Bifacial surficial retouch.
	20	biface	69	25	12	24		Bifacial surficial retouch.
	21	biface	57	33	16	32		Bifacial surficial retouch.
	22	biface	58	39	9	23		Bifacial surficial retouch.
	23	biface				81		Bifacial surficial retouch.
	24	biface				13		Bifacial surficial retouch.
	25	biface				4		Lateral fragment; bifacial surficial retouch.
	26	uniface	79	54	11	50		Unifacial edge retouch around approximately 70% of edge of flake.
	27	biface				42		Bifacial surficial retouch.
	28	biface	100	52	27	106		Bifacial surficial retouch, by flakes.
	29	uniface	65	38	23	72		Minimal unifacial edge retouch.
	30	biface	61	45	20	57		Half worked with bifacial surficial retouch.
	31	biface	49	27	9	17		Flake with bifacial edge retouch.
	32	biface	74	40	20	69		Bifacial surficial retouch - minimal modification. Bifacial edge retouch on one edge.
	33	biface	73	35	20	57		Bifacial surficial retouch.
	34	biface	75	38	20	55		Bifacial surficial retouch.
	35	viface				36		Bifacial surficial retouch.
	36	uniface				27		Unifacial surficial retouch on flake. Bifacial edge retouch.
	37	biface				41		Bifacial surficial retouch.
	38	uniface	60	30	11	19		Unifacial edge retouch on flake.
	39	viface	51	47	19	49		Bifacial surficial retouch. Large area of cortex on one face.
	40	biface				6		Bifacial surficial retouch.
	41	biface	46	25	10	12		Bifacial surficial retouch.
	42	biface	70	42	18	51		Bifacial surficial retouch.
	43	biface	66	39	17	37		Bifacial surficial retouch.
	44	uniface	42	36	13	21		Flake with unifacial edge retouch.
	45	uniface	49	27	7	14		Flake with minimal unifacial edge retouch.
	46	biface				59		Bifacial surficial retouch.
	47	hammer-stone				198		Battering along several edges.
	48	mano				1023		Mano - igneous with evidence of pitting.
Walkover 2	3	biface				41		Lateral fragment; bifacial surficial retouch.
	4	biface				31		Bifacial surficial retouch.
	5	biface				16		Possibly portion of projectile point; notched, bifacial surficial retouch.
	6	biface				16		Bifacial surficial retouch.
	7	biface				35		Bifacial surficial retouch.
	8	biface				9		Tip of pointed biface; bifacial surficial/unifacial edge retouch. Heat treated.

Table B.1 (Page 16)

Provenience [Site]	Catalogue No.	Artifact Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (gr)	Edge Angle	Comments
	9	biface				33		Bifacial surficial retouch, minimal on one face.
	10	biface				38		Lateral section; bifacial surficial retouch.
	11	biface				14		Small lateral section; bifacial surficial edge retouch.
	12	biface				50		Bifacial surficial/unifacial edge retouch.
	13	uniface				4		Unifacial retouch on convex edge.
	14	biface				11		Lateral section, bifacial surficial retouch/minimal unifacial retouch.
	15	biface				51		Bifacial surficial retouch.
	16	uniface	79	56	23	90		Unifacial surficial and edge retouch.
	17	biface				8		Bifacial surficial retouch.
[Hurricane Creek]								
Walkover 1	1	biface				12		Pointed biface fragment, bifacial surficial retouch.
	2	biface				18		Bifacial surficial retouch.
	3	biface				29		Broken; bifacial surficial retouch.
	4	uniface				84		Unifacial edge retouch on large flake.
	5	uniface	37	25	7	6		Flake with unifacial edge retouch on one edge.
[Silver Towers]								
Walkover 1	2	biface	75	40	17	55		Bifacial surficial retouch, unifacial edge retouch on opposite faces.
Walkover 2	1	biface				53		Broken; bifacial surficial retouch.
	2	biface				2		Fragment; bifacial surficial retouch.
[South End Shell]								
Walkover 1	2	biface				17		Bifacial surficial retouch.
	3	uniface				67		Flake with minimal unifacial edge retouch on one edge.
	4	uniface				82		Flake with minimal unifacial edge retouch on one edge.
[S. R. Hook]								
Walkover 1	2	biface	14	38	26	63		Bifacial surficial retouch.
	3	biface				36		Bifacial surficial retouch.
	4	uniface				28		Flake with two areas of unifacial retouch on one edge.
	5	uniface				12		Flake with unifacial edge retouch on one edge.
Walkover 2	1	hoe	84	47	28	128		Bifacial surficial retouch; extensive hoe polish, especially one surface.
	2	drill				4		Possible drill bit; bifacial surficial retouch.
	3	biface				39		Bifacial surficial retouch.
	4	biface	28	26	6	4		Small biface; bifacial surficial retouch.
	5	biface				11		Lateral fragment; bifacial surficial retouch; bifacial edge retouch.
[Sunday]								
Walkover 1	2	exotic chert				2		Tertiary flake of exotic raw material, possibly Dongola.

APPENDIX C

Projectile Points

This analysis uses a mapping procedure consisting of a series of metric measurements from which a polygon can be generated to approximate the important morphological features of the projectile point. This method of analysis requires the selection of locations along the edge of the artifact between which a series of measurements can be taken. These locations must be relatively few in number but significant with respect to major morphological features of the artifact. These locations are referred to as inflection points. An inflection point is defined as any location along the edge of the artifact at which there is a change of direction relative to the x and/or y axis of a cartesian coordinate system. Orientation of the artifact on a corrdinate system is such that the y axis crosses the tip of the projectile point and passes through the midpoint of the base. The point is situated on the x axis. The series of measurements is then taken and recorded. The xy coordinates of the inflection points are generated with the aid of a digital computer. Measurements presented in Table C.1 were generated using these data. For a more detailed discussion of this method, see Spitzer and Batura (n.d.).

Because of the importance of projectile point morphology in establishing chronological associations, the following descriptive information is presented. These measurements and descriptions are not exhaustive but are meant to represent those attributes closely identified with type assignments.

All metric measurements were taken on complete pieces and those incomplete pieces with a high probability that the

missing portion could not affect the results. No distinction is made between non-occurrence on complete and the inability to evaluate an attribute due to incompleteness.

Measurements are to the nearest hundredth millimeter and nearest gram. Due to the uncertainty of establishing the presence of heat treatment, that attribute was not recorded.

Projectile point type classifications are based on descriptions provided by Bell 1958, 1960; Conrad 1981; Perino 1968, 1971; and Luchterhand 1970. For comparisons, the projectile points from Koster and Napoleon Hollow were examined. Since many of the projectile points from these sites are from dated contexts, these comparisons were an important factor in determining culture affiliation and type assignments.

Table C.1 Metric and Discrete Variables for Projectile Points.

Cultural affiliation	Point type	Site name	Catalog No.	Plate No.	Maximum length	Blade length	Maximum width	Maximum thickness above max. width	Maximum thickness below max. width	weight (grams)	Base width	Basal radius	Notch width	Minimum sub-maximum width
Early Archaic	Graham Cave Side Notch	Quasar	3-8	1-d	-	-	20.79	8.0	8.3	9	22.66	4	11.30	23.95
Early Archaic	MacCorkle	Burz*	3-21	1-h	-	-	34.59	8.1	7.5	8	22.48	3	10.34	15.61
Early Archaic	St. Charles Corner Notch	Burz	1-91	1-b	-	-	25.39	9	8.2	10	14.35	7.1	9.10	21.79
Early Archaic	St. Charles Corner Notch	Burz	3-77	1-g	-	-	32.78	7.9	6.3	21	24.63	1.6	24.36	-
Early Archaic	Beaver Lake	Bullseye	1-6	1-c	-	-	23.77	6.4	2.4	6	23.77	3.20	14.89	-
Early Archaic	Newberg	Burline	3-12	1-i	32.70	9.50	30.6	7.4	5.2	10	23.61	-	19.50	-
Middle Archaic	Calf Creek	Quasar	1-2	4-h	-	-	-	8.9	3.3	9	-	-	21.72	19.18
Middle Archaic	Calf Creek	Quasar	3-12	4-i	-	-	-	8.2	10.3	9	22.98	3.6	10.35	19.59
Middle Archaic	Godar	Bullseye	1-3	2-a	-	-	68	9.3	8.2	11	33.56	-	18.39	27.54
Middle Archaic	Godar	Britten	2-9	2-c	-	-	28.29	9.3	7.6	14	21.30	-	8.71	27.09

*General surface collection from Burline sandridge; not site specific.

Table C.1

Cultural affiliation	Point type	Site name	Catalog No.	Plate No.	Maximum length	Blade length	Maximum width	Maximum thickness above max. width	Maximum thickness below max. width	weight (grams)	Base width	Basal radius	Notch width	Minimum sub-maximum width
Middle Archaic	Godar	Burz	1-80	2-g	-	-	20.2	7.5	7.1	5	15.09	-	6.15	17.32
Middle Archaic	Godar	Burz	1-82	2-e	-	-	23.21	7.5	7.5	6	19.63	-	8.61	-
Middle Archaic	Godar	Burz	1-84	2-i	52.6	39.4	26.2	7.7	7.7	15	21.59	-	6.31	29.80
Middle Archaic	Godar	Burz	1-98	2-k	-	-	23.8	8.1	6.6	6	23.8	-	16.76	26.10
Middle Archaic	Godar	Burz	3-14	2-h	-	-	30.3	8.6	8.1	12	19.85	-	12.2	22.29
Middle Archaic	Godar	Burz	3-18	2-d	-	-	22.92	6.4	4.4	4	22.92	-	19.36	30.12
Middle Archaic	Godar	Burz	3-23	2-l	-	-	30.0	9.8	7.5	5	16.21	-2.5	14.64	16.21
Middle Archaic	Godar	Burz	3-75	2-n	-	-	25.61	8.3	6.7	10	17.64	-	9.40	-
Middle Archaic	Godar	Burz	3-87	2-m	-	-	30.61	7.3	7.8	9	21.72	-	7.36	26.61
Middle Archaic	Godar	Burz	3-639	2-f	-	-	-	7.5	6.8	5	16.31	-	7.80	21.52
Middle Archaic	Godar	Burz	3-656	2-j	-	-	26.60	8.5	8.9	13	21.41	-	5.72	25.01

Table C.1

Cultural affiliation	Point type	Site name	Catalog No.	Plate No.	Maximum length	Blade length	Maximum width	Maximum thickness above max. width	Maximum thickness below max. width	weight (grams)	Base width	Basal radius	Notch width	Minimum sub-maximum width
Middle Archaic	Godar	Narrow Sandy	1-2	2-b	-	-	31.61	8.5	6.4	16	25	.70	9.72	18.07
Middle Archaic	Hardin Barbed	Burz	3-37	1-f	44.0	33.20	22.02	5.4	2.7	10	22.02	4.0	21.84	20.21
Middle Archaic	Hardin Barbed	Burz	3-39	1-e	-	-	20.75	9.1	9.2	20	-	0.50	13.12	-
Middle Archaic	Hardin Barbed	Burz	3-69	1-a	-	-	18.93	9.2	8.0	10	18.93	0	18.97	23.21
Middle Archaic	Helton Expanding Stem	South End Shell	1-1	4-d	44.0	27.80	34.80	8.6	7.8	15	24.20	-2.40	10.62	26.71
Middle Archaic	Middle Archaic Side Notched	Bullseye	1-5	3-g	-	-	29.29	7.8	7.3	18	22.93	1.50	11.77	-
Middle Archaic	Middle Archaic Side Notched	Britten	1-1	3-f	-	-	26.40	7.2	6.7	11	20.90	1.10	7.70	24.91
Middle Archaic	Middle Archaic Side Notched	Burz	3-618	3-c	-	-	28.80	8.3	6.1	8	22.61	0	7.79	-
Middle Archaic	Middle Archaic Side Notched	Burz	3-662	3-b	-	-	20.91	6.9	5.1	4	20.91	2.50	19.57	27.61
Middle Archaic	Middle Archaic Side Notched	Howard	3-2	3-e	-	-	26.70	8.5	7.9	8	19.22	0	13.28	21.32
Middle Archaic	Middle Archaic Side Notched	Hurricane Creek	1-6	3-d	-	-	29.45	9.6	7.4	12	25.60	1.40	4.51	29.0

Table C.1

Cultural affiliation	Point type	Site name	Catalog No.	Plate No.	Maximum length	Blade length	Maximum width	Maximum thickness above max. width	Maximum thickness below max. width	weight (grams)	Base width	Basal radius	Notch width	Minimum sub-maximum width
Middle Archaic	Middle Archaic Side Notched	Hurri-cane Creek	1-9	3-a	-	-	20.36	8.5	7.7	7	20.36	6.20	6.13	27.70
Middle Archaic	Matanza Side Notched	Burz	1-96	5-e	-	-	17.0	6.8	5.7	4	11.83	-1.0	8.25	16.11
Middle Archaic	Matanza Side Notched	Burz	3-625	5-d	-	-	19.60	7.6	7.6	7	13.26	0	12.49	-
Middle Archaic	Matanza Side Notched	Quasar	1-1	5-f	49.80	37.40	20.29	6.3	5.6	7	13.60	2.70	7.41	-
Middle Archaic	Osceola Side Notched	Quasar	3-3	4-e	68.70	30.40	20.20	8.7	8.7	16	17.60	1.70	6.49	18.67
Middle Archaic	Table Rock Stemmed	Burz	1-81	4-f	-	-	17.51	7.2	6.0	5	10.39	0	7.29	11.63
Middle Archaic	M.A.Unnamed Side Notched Concave Base	Bullseye	1-2	6-b	31.60	20.30	20.81	5.1	4.9	4	17.21	1.80	8.55	19.19
Middle Archaic	M.A.Unnamed Side Notched Concave Base	Burz	3-74	6-c	-	-	23.07	7.9	6.0	5	23.07	1.50	18.01	25.11
Middle Archaic	M.A.Unnamed Side Notched Concave Base	Hurri-cane Creek	1-8	6-a	-	-	28.49	7.3	6.4	5	19.26	2.20	10.45	30.66
Middle Archaic	M.A.Unnamed Side Notched Concave Base	Narrow Sandy	1-1	6-e	54.20	40.10	24.61	6.0	5.2	8	17.03	1.80	9.10	19.20

Table C.1

Cultural affiliation	Point type	Site name	Catalog No.	Plate No.	Maximum length	Blade length	Maximum width	Maximum thickness above max. width	Maximum thickness below max. width	weight (grams)	Base width	Basal radius	Notch width	Minimum sub-maximum width
Middle Archaic	M.A.Unnamed Side Notched Concave Base	Quasar	3-5	6-f	-	-	29.90	7.0	7.7	22	19.20	2.30	33.11	23.30
Middle Archaic	M.A.Unnamed Side Notched Concave Base	Silver Towers	1-1	6-d	76.0	48.70	24.80	8.5	9.3	21	22.01	1.40	11.21	25.48
Middle Archaic	M.A.Unnamed Side Notched	Bullseye	1-4	7-a	46.80	38.40	20.08	6.9	6.8	7	16.26	-3.90	5.35	16.49
Middle Archaic	M.A.Unnamed Side Notched	Britten	2-11	7-b	38.25	27.85	22.30	9.0	9.0	9	21.20	0	2.55	17.80
Middle Archaic	M.A.Unnamed Side Notched	Burline	1-4	7-c	-	-	21.70	-	-	4	18.43	0	6.64	-
Middle Archaic	M.A.Unnamed Side Notched	Burline	3-15	7-d	-	-	17.60	5.6	5.3	3	11.49	-2.60	6.83	18.09
Middle Archaic	M.A.Unnamed Side Notched	Burline	3-16	7-e	-	-	24.27	6.0	6.2	3	18.14	-4.50	8.67	21.86
Middle Archaic	M.A.Unnamed Side Notched	Burz	1-93	7-h	-	-	19.41	6.6	6.2	3	14.01	0	7.0	16.30
Middle Archaic	M.A.Unnamed Side Notched	Burz	1-602	7-f	-	-	-	5.6	5.8	4	64.67	.10	45.95	55.29
Middle Archaic	M.A.Unnamed Side Notched	Burz	3-80	7-j	-	-	18.20	8.5	6.5	4	15.14	-2.40	7.32	20.42

Table C.1

Cultural affiliation	Point type	Site name	Catalog No.	Plate No.	Maximum length	Blade length	Maximum width	Maximum thickness above max. width	Maximum thickness below max. width	weight (grams)	Base width	Basal radius	Notch width	Minimum sub-maximum width
Middle Archaic	M.A.Unnamed Side Notched	Burz	3-617	7-i	-	-	15.89	6.6	5.3	2	11.61	2.40	6.85	13.88
Middle Archaic	M.A.Unnamed Side Notched	Burz	3-637	7-g	-	-	28.82	8.6	7.9	10	23.10	3.70	2.90	20.30
Middle Archaic	M.A.Shallow Side Notched	Burz	1-79	5-b	-	-	28.89	8.3	7.4	10	22.52	2.30	10.86	20.06
Middle Archaic	M.A.Shallow Side Notched	Burz	3-608	5-a	-	-	25.19	8.1	6.8	7	18.52	.80	11.09	17.51
Middle Archaic	M.A.Shallow Side Notched	Burz	3-609	5-c	-	-	16.90	5.7	4.7	6	17.40	1.60	6.92	12.66
Middle Archaic	M.A. Flare Stem	Burz	3-9	4-g	-	-	24.11	9.7	7.3	12	17.11	0	18.01	15.12
Middle Archaic	M.A.Cane Shaped Notch	Burz	1-78	4-b	-	-	21.23	6.4	6.1	9	18.40	-1.80	12.80	-
Middle Archaic	M.A.Cane Shaped Notch	Burz	3-16	4-c	-	-	28.52	6.6	6.5	10	21.16	-1.80	13.32	-
Middle Archaic	M.A.Cane Shaped Notch	Howard	2-2	4-a	-	-	26.49	-	-	0	26.49	-4.20	23.54	28.41
Late Archaic	Kramer Stemmed	Burline	3-17	8-g	65.80	44.20	24.80	9.8	8.5	18	14.69	-5.0	16.51	17.29
Late Archaic	Kramer Stemmed	Burz	3-47	8-h	-	-	29.04	6.9	6.8	13	22.40	0	11.94	17.60

Table C.1

Cultural affiliation	Point type	Site name	Catalog No.	Plate No.	Maximum length	Blade length	Maximum width	Maximum thickness above max. width	Maximum thickness below max. width	weight (grams)	Base width	Basal radius	Notch width	Minimum sub-maximum width
Late Archaic	Merom Expanding Stem	Howard	1-53	8-d	22.50	14.80	15.64	5.2	4.5	2	-	0	6.28	-
Late Archaic	Sedalia Lanceolate	Wild Onion	1-11	8-e	-	-	32.78	-	-	16	-	0	0	0
Late Archaic	L.A. Titterington	Burz	1-85	8-b	96.60	45.20	33.80	8.6	7.7	30	-	-1.80	-	-
Early Woodland	Belknap	Burz	1-605	9-a	-	-	30.0	7.0	6.8	7	19.47	0	19.49	-
Early Woodland	Belknap	Burz	3-11	9-g	-	-	35.01	7.0	6.8	15	21.0	0	22.31	-
Early Woodland	Belknap	Burz	3-17	9-c	-	-	34.68	7.4	6.3	16	21.09	0	27.38	-
Early Woodland	Belknap	Burz	3-31	9-b	-	-	23.19	11.1	9.8	11	23.19	0	23.97	-
Early Woodland	Belknap	Burz	3-56	9-l	-	-	43.70	7.2	4.0	16	11.49	-4.50	28.79	-
Early Woodland	Belknap	Burz	3-73	9-f	-	-	36.60	9.7	6.8	16	10.97	-4.50	21.72	-
Early Woodland	Belknap	Burz	3-631	9-k	-	-	-	7.5	3.5	11	-	-4.50	-	-
Early Woodland	Belknap	Burz	3-663	9-i	-	-	37.59	7.1	6.6	14	17.54	-	24.51	-

Table C.1

Cultural affiliation	Point type	Site name	Catalog No.	Plate No.	Maximum length	Blade length	Maximum width	Maximum thickness above max. width	Maximum thickness below max. width	weight (grams)	Base width	Basal radius	Notch width	Minimum sub-maximum width
Early Woodland	Belknap	Burz	3-692	9-j	-	-	15.58	4.2	3.7	2	5.90	-2.20	19.14	-
Early Woodland	Belknap	Flat Top	1-8	9-h	69.40	45.40	34.41	8.9	8.4	20	22.20	0	25.56	-
Early Woodland	Belknap	Wild Onion	1-4	9-d	51.10	33.60	-	9.5	5.9	14	18.42	-8.60	18.64	-
Early Woodland	Belknap	Wild Onion	2-5	9-e	-	-	27.43	7.4	7.0	8	10.06	-3.90	-	-
Middle Woodland	Snyders Corner Notch	Burz	3-13	10-b	-	-	33.32	8.1	8.5	12	27.52	-5.30	12.08	28.45
Middle Woodland	Snyders Corner Notch	Burz	3-25	10-f	-	-	-	10.06	9.2	22	21.72	-2.90	13.0	27.54
Middle Woodland	Snyders Corner Notch	Hurri-cane Creek	1-7	10-c	36.90	20.10	26.10	6.6	6.8	10	19.40	-7.00	11.26	23.49
Middle Woodland	Snyders Corner Notch	Quasar	3-2	10-a	49.50	33.40	25.30	7.4	7.0	15	20.13	-2.90	12.09	26.92
Middle Woodland	Snyders Corner Notch	Wild Onion	1-2	10-e	-	-	25.68	9.0	8.8	23	25.68	-2.60	27.29	25.68

Table C.1

Cultural affiliation	Point type	Site name	Catalog No.	Plate No.	Maximum length	Blade length	Maximum width	Maximum thickness above max. width	Maximum thickness below max. width	weight (grams)	Base width	Basal radius	Notch width	Minimum sub-maximum width
Middle Woodland	Snyders Corner Notch	Wild Onion	2-1	10-d	57.60	40.0	25.10	9.0	6.8	19	25.10	-3.60	27.84	25.36
Middle Woodland	Steuben Expanding Stem	Burz	1-77	11-a	26.70	10.0	24.30	7.6	7.5	5	18.81	-5.00	11.49	24.51
Middle Woodland	Steuben Expanding Stem	Burz	3-22	11-b	-	-	23.99	7.1	7.0	6	17.67	-2.60	12.98	23.68
Woodland	Type Indeterminate	Burz	3-51	11-d	-	-	71.92	9.5	9.5	15	24.80	-9.50	54.29	29.93
Woodland	Type Indeterminate	Burz	3-675	11-e	-	-	30.51	8.3	7.5	8	20.52	-4.60	15.58	20.52
Woodland	Type Indeterminate	Half Circle	1-1	11-c	55.30	28.0	22.60	8.0	7.7	11	15.83	0	6.04	14.58
Woodland	Type Indeterminate	F.S. Field	2-2	11-f	-	-	26.90	7.8	7.2	18	17.17	-2.90	13.66	21.26
Mississippian	Madison Triangle	Burz	3-54	12-b	-	-	34.59	-	-	7	0	0	0	24.61
Mississippian	Madison Triangle	Burz	3-78	12-a	-	-	34.59	-	-	4	0	0	0	19.85
Type Indeterminate	Type Indeterminate	Britten	2-10	13-a	-	-	-	8.4	6.9	10	-	-3.20	15.49	-

Table C.1

Cultural affiliation	Point type	Site name	Catalog No.	Plate No.	Maximum length	Blade length	Maximum width	Maximum thickness above max. width	Maximum thickness below max. width	weight (grams)	Base width	Basal radius	Notch width	Minimum sub-maximum width
Type Indeter-minate	Type Indeterminate	Burline	2-8	15-c	-	-	35.59	8.8	8.9	21	23.50	-6.90	17.34	31.42
Type Indeter-minate	Type Indeterminate	Burline	3-14	14-a	52.00	31.30	28.10	9.5	8.8	12	19.40	-6.30	13.76	20.57
Type Indeter-minate	Type Indeterminate	Burz	1-83	15-g	-	-	26.97	7.7	6.8	13	-	0	11.44	-
Type Indeter-minate	Type Indeterminate	Burz	1-86	15-f	50.20	38.0	32.50	9.8	7.8	17	23.04	1.30	8.78	14.81
Type Indeter-minate	Type Indeterminate	Burz	1-87	16-a	48.50	34.70	25.51	6.3	6.1	10	-	0	9.12	-
Type Indeter-minate	Type Indeterminate	Burz	1-88	15-e	-	-	22.51	5.9	5.1	7	14.20	-3.50	10.75	15.99
Type Indeter-minate	Type Indeterminate	Burz	1-94	16-h	24.20	11.10	26.42	7.5	6.8	5	18.31	-5.0	9.59	24.51
Type Indeter-minate	Type Indeterminate	Burz	1-601	14-c	33.90	20.0	27.20	6.6	5.8	6	21.19	-3.0	12.55	22.60

Table C.1

Cultural affiliation	Point type	Site name	Catalog No.	Plate No.	Maximum length	Blade length	Maximum width	Maximum thickness above max. width	Maximum thickness below max. width	weight (grams)	Base width	Basal radius	Notch width	Minimum sub-maximum width
Type Indeterminate	Type Indeterminate	Burz	1-603	16-j	-	-	29.94	6.8	5.6	6	19.46	0	14.73	19.09
Type Indeterminate	Type Indeterminate	Burz	2-1	13-b	-	-	23.0	7.1	6.0	8	14.60	0	10.87	13.87
Type Indeterminate	Type Indeterminate	Burz	2-2	13-c	-	-	29.0	7.3	8.0	14	23.55	-3.30	10.95	23.44
Type Indeterminate	Type Indeterminate	Burz	3-7	14-h	-	-	25.90	10.6	9.6	15	21.41	-1.70	8.09	19.29
Type Indeterminate	Type Indeterminate	Burz	3-83	16-m	-	-	24.18	8.5	8.1	14	14.99	-	8.94	21.89
Type Indeterminate	Type Indeterminate	Burz	3-27	16-f	-	-	-	7.3	6.8	8	19.21	-4.40	13.27	24.30
Type Indeterminate	Type Indeterminate	Burz	3-30	15-h	-	-	-	7.4	6.2	9	-	-5.80	15.54	-
Type Indeterminate	Type Indeterminate	Burz	3-33	16-k	41.70	26.70	25.89	7.0	4.7	8	-	-	13.62	-

Table C.1

Cultural affiliation	Point type	Site name	Catalog No.	Plate No.	Maximum length	Blade length	Maximum width	Maximum thickness above max. width	Maximum thickness below max. width	weight (grams)	Base width	Basal radius	Notch width	Minimum sub-maximum width
Type Indeterminate	Type Indeterminate	Burz	3-36	15-a	-	-	32.81	6.5	5.1	5	22.31	1.10	10.24	21.17
Type Indeterminate	Type Indeterminate	Burz	3-41	14-j	-	-	-	5.1	4.5	10	-	1.10	13.91	10.72
Type Indeterminate	Type Indeterminate	Burz	3-44	14-f	-	-	-	-	-	13	17.24	1.50	12.16	16.02
Type Indeterminate	Type Indeterminate	Burz	3-55	14-g	-	-	27.83	12.9	10.1	16	18.58	-4.0	19.88	21.28
Type Indeterminate	Type Indeterminate	Burz	3-86	15-b	-	-	33.12	12.1	12.3	22	23.98	0	13.93	30.37
Type Indeterminate	Type Indeterminate	Burz	3-96	13-h	39.50	26.20	-	6.8	6.1	5	-	0	10.59	14.79
Type Indeterminate	Type Indeterminate	Burz	3-98	16-d	-	-	20.29	7.5	4.3	5	20.29	-4.80	15.90	27.69
Type Indeterminate	Type Indeterminate	Burz	3-601	16-g	-	-	-	5.9	5.3	5	16.99	-1.40	2.84	18.19

Table C.1

Cultural affiliation	Point type	Site name	Catalog No.	Plate No.	Maximum length	Blade length	Maximum width	Maximum thickness above max. width	Maximum thickness below max. width	weight (grams)	Base width	Basal radius	Notch width	Minimum sub-maximum width
Type Indeterminate	Type Indeterminate	Burz	3-607	14-i	-	-	34.0	8.0	6.8	12	21.68	-2.10	16.42	22.19
Type Indeterminate	Type Indeterminate	Burz	3-612	14-d	-	-	-	8.3	6.1	6	20.14	1.60	9.11	19.59
Type Indeterminate	Type Indeterminate	Burz	3-613	15-i	92.40	24.60	70.14	16.0	2.7	42	-	-1.50	65.36	-
Type Indeterminate	Type Indeterminate	Burz	3-619	16-l	-	-	-	7.5	7.4	10	-	0	6.09	-
Type Indeterminate	Type Indeterminate	Burz	3-632	16-i	-	-	25.34	7.5	6.3	7	18.25	0	12.24	15.64
Type Indeterminate	Type Indeterminate	Burz	3-642	13-d	-	-	19.91	7.5	6.5	4	10.91	0	12.30	12.27
Type Indeterminate	Type Indeterminate	Burz	3-645	13-e	-	-	29.40	8.9	5.9	8	25.79	-1.90	18.89	27.28
Type Indeterminate	Type Indeterminate	Burz	3-655	13-f	-	-	23.70	8.1	7.2	7	21.30	2.20	9.90	15.81

Table C.1

Cultural affiliation	Point type	Site name	Catalog No.	Plate No.	Maximum length	Blade length	Maximum width	Maximum thickness above max. width	Maximum thickness below max. width	weight (grams)	Base width	Basal radius	Notch width	Minimum sub-maximum width
Type Indeterminate	Type Indeterminate	Burz	3-667	13-g	-	-	28.91	7.5	6.5	7	23.90	-2.10	12.10	23.40
Type Indeterminate	Type Indeterminate	Burz	3-672	15-d	-	-	31.91	7.8	7.6	13	20.91	.80	13.21	-
Type Indeterminate	Type Indeterminate	Burz	3-677	16-b	-	-	-	9.5	8.4	13	20.21	-5.20	16.49	26.29
Type Indeterminate	Type Indeterminate	Howard	1-50	14-b	58.50	39.80	31.60	10.5	9.3	16	20.19	-0.60	13.12	21.27
Type Indeterminate	Type Indeterminate	Howard	1-51		-	-	23.99	8.6	8.0	9	20.21	-1.80	10.76	21.20
Type Indeterminate	Type Indeterminate	Howard	1-52	14-e	39.60	23.60	30.11	9.0	8.0	10	19.30	0	13.59	17.19
Type Indeterminate	Type Indeterminate	Quasar	3-4	17-b	76.40	35.80	23.70	10.8	10.7	24	22.20	-2.30	18.44	27.97
Type Indeterminate	Type Indeterminate	F.S.Field	2-1	17-d	53.30	20.60	22.60	9.8	9.5	13	19.38	-2.20	19.13	21.66

APPENDIX D

Ceramic Artifact Descriptions

Ceramic material was collected from five sites and the Burline Sandridge. Below, the ceramic assemblages from these sites and specimens previously collected from four Burline Sandridge sites are summarized to provide the following information (when available):

1) time period
2) cultural affiliation
3) vessel portions
4) temper
5) surface treatment
6) decoration
7) thickness
8) vessel form

Nutwood Levee

F.S. Field

All sherds were collected in 1968 but never reported. Thirty-one sherds were recovered. Two Middle Woodland body sherds are from separate vessels. One is a Pike or Baehr exhibiting a brushed exterior surface. The temper is limestone. Thickness is 6.7 mm. The second sherd is classified as Hopewell with broad incised lines. Temper is grog. Thickness is 5.5 mm. Two lip/rim sherds are from separate Late Woodland vessesl. The first has a cordwrapped stick decoration on the lip exterior and a node on the upper rim. The exterior surface is plain and the lip is beveled to the exterior. Temper is sand. Thickness ranges from 5.3 mm on the lip to 7.6 mm at the rim. This sherd is probably not later than Weaver/White Hall. The second sherd has been highly mottled across a cordmarked exterior surface. Plain dowell impressions occur along the lip exterior.

Temper is sand. Thickness range from 4.4 mm at the lip to 5.5 mm on the rim. A third lip/rim sherd is either Middle Woodland or Late Woodland. Incised lines are present along the rim. The exterior lip exhibits plain dowel impressions. Temper is sand and grit. Thickness ranges from 37 mm at the lip to 3.9 on the rim. The remaining body sherds are relatively thin with sand and grit temper. They are probably Late Woodland.

Hidden Ridge

The only Middle Woodland body sherd has sand and grit temper and is 10 mm thick. It is probably Havana. Three Late Woodland body sherds are from three vessels. One sherd is late Late Woodland and has a smoothed over cordmarked exterior, grit temper and is 5 mm thick. The second is a rim/neck/body sherd with grit and sand temper. The exterior surface is plain, common to Bluff material. The thickness is 7.3 mm. The third sherd is badly weathered. The presence of sand and grit temper and the thinness (5 mm) suggest late Late Woodland.

Hartwell Levee

Bullseye

Most of the sherds are Early Woodland. One lip/rim sherd is a Black Sand Incised, decorated on the exterior rim by incised lines forming chevrons. (Plate18-d).Temper is grit, thickness ranges from 8 mm (lip) to 13 mm (rim). Two body sherds have lenticulate punctates. One is sand tempered and 7.9 mm thick. The second has limestone and sand temper and is 6.7 mm thick (Plate18-c,f). Each is classified as Liverpool Series-punctate.Another body sherd exhibits either fabric impressed or has cordmarking (Plate 18-e). Temper is sand and chert.

Thickness is 13.9 mm. It is probably Early Woodland. Two lip/rim sherds are classified as Type Indeterminate (Plate 18-a,b). Each is sand and grit tempered. Thickness at the lip is 4 mm and 6 mm respectively. The remaining body sherds are classified as Black Sand Incised (Plate 19).

Quasar

Although only six sherds were recovered, three separate cultural groups are represented. A single Early Woodland body sherd is classified as Liverpool Ware and exhibits exterior cordmarking, sand and grit temper and is 9 mm thick. One Middle Woodland Hopewell or Pike or Baehr sherd was recovered (Plate 20-b). It has limestone and grog temper, has plain rocker exterior decoration and is 6 mm thick. Two late Late Woodland sherds exhibit reddish paste and grit temper (Plant 20-c,f). Thicknesses are 4.7 mm and 3 mm respectively. Two sherds are classified as Type Indeterminate (Plate 20-a,e). One is sand tempered and has an overlapping cordmarked exterior surface. The thickness is 7 mm. The second has a plain surface, is limestone tempered and is 5.8 mm thick.

Wild Onion

Two sherds were recovered. One body sherd is classified as Liverpool Series, is 8.6 mm thick and has sand and chert temper. The second is 6.9 mm thick, has limestone temper and is a Type Indeterminate.

Burline Sandridge

Four sherds are Early Woodland. Three of these exhibit exterior cordmarking and are tempered with sand and grit. Thicknesses are 7 mm, 7.8 mm and 9.5 mm. They have been classified as Liverpool cordmarked. A fourth sherd is Black Sand Incised with chert and sand temper (Plate 21-b). Thickness is

7.8 mm. Five sherds, containing sand tempering are classified as Late Woodland. One of these is a lip/rim sherd decorated with punctates made by a hollow cylinder. The surface treatment is smoothed over cordmarking. Thickness ranges from 3 mm at the lip to 6 mm on the rim. This sherd is classified as White Hall (Plate 21-c). One sherd appears to be an applied lug or handle as is either Late Woodland or Mississippian (Plate 21-a). The two remaining sherds are classified as Type Indeterminate. One is grog tempered and exhibits a highly smoothed cordmarked or fabric exterior surface. Thickness is 8 mm. The second sherd is grit and sand tempered, has a plain surface and is 6.8 mm thick.

Britten

This sherd is sand and chert tempered, has a reddish paste and is 5.4 - 7.5 mm thick. It has a plain exterior surface and is classified as Type Indeterminate.

Flat Top

A single sand tempered sherd, 10 mm thick, was recovered. It has a plain exterior surface and is classified as Type Indeterminate.

Silver Towers

All three sherds are Early Woodland. Each is sand tempered. Two exhibit exterior incised parallel lines and are classified as Black Sand Incised (Plate22a,b).A third has a plain exterior surface and is classified as Liverpool Series.

Sunday

Two decorated lip/rim sherds and a single rim sherd were recovered. All the material is Early Woodland. One sherd is Black Sand Incised with parallel lines at a 45^{o} angle to the lip (Plate 22-d). The lip is beveled to the exterior. The temper is sand and chert with a reddish paste. Lip thickness is 5.7 mm.

Thickness ranges from 5.7 mm (lip) to 6.3 mm (rim) with a reddish paste. The second sherd is similar to Peisker Pinched Punctate (Plate 22-e). Finger nail punctates occur below the lip. The interior lip has thumb impressions. The reddish paste has predominately grog temper but sand, chert and grit are also present. Thickness varies from 5.5 mm (lip) to 8.8 mm (rim). The third sherd is Liverpool Series with dragged hemiconical punctates above incised lines (Plate 22-c). A reddish paste is tempered with sand and chert. Rim thickness is 8.4 mm.

APPENDIX E

Scientific Names of Plants Mentioned in Text

SCIENTIFIC NAMES OF PLANTS MENTIONED IN THIS TEXT

Acer negundo, boxelder
A. saccharinum, silver maple
A. saccharum, sugar maple
Amaranthus tamariscinus, water hemp
A. tuberculatus, water hemp
Andropogon gerardi, big bluestem
Asclepias incarnata, swamp milkweed

Betula spp., birch
Bidens spp., beggar-ticks

Carpinus caroliniana, hornbeam
Carya cordiformis, bitternut hickory
C. illinoensis, pecan
C. laciniosa, shellbark hickory, kingnut
C. ovata, shagbark hickory
Cercis canadensis, redbud
Cephalanthus occidentalis, buttonbush
Chenopodium bushianum, goosefoot
Crataegus spp., hawthorn
Cyperus esculentus, nutgrass

Diospyros virginiana, persimmon

Forestiera acuminata, swamp privet
Fraxinus americana, white ash
F. pennsylvanica var. *subintegerrima*, green ash

Gleditsia triacanthos, honey locust

Ilex decidua, deciduous holly
Iva annua, marshelder, sumpweed

Juglans cinerea, butternut
J. nigra, black walnut

Leersia oryzoides, ricecut grass

Morus rubra, red mulberry

Nelumbo lutea, lotus

Ostrya virginiana, ironwood

Panicum virgatum, switchgrass
Picea spp., spruce
Platanus occidentalis, sycamore
Polygonum spp., smartweed
Populus deltoides, cottonwood

Quercus alba, white oak
Q. bicolor, swamp white oak
Q. imbricaria, shingle oak
Q. macrocarpa, bur oak
Q. palustris, pin oak
Q. rubra, red oak
Q. velutina, black oak

Sagittaria latifolia, duck potato, arrowhead
Salix spp., willow
Sassafras albidum, sassafras
Scirpus validus, great bulrush
Sorghastrum nutans, Indian grass
Spartina pectinata, slough grass
Sporobolus spp., dropseed

Tilia americana, basswood
Typha latifolia, cattail

Ulmus americana, American elm
U. rubra, slippery elm

Vitis spp., grape

Xanthium spp., cocklebur

APPENDIX F

Tabulation Form and Definitions

The following definitions were applied to the artifacts discussed in this report. They represent only those items recovered and identified during the survey. The definitions follow those reported by Crabtree 1972 and Center for American Archeology (n.d.).

CHIPPED STONE

Projectile Point - All pointed, complete, symmetrical, finished bifaces/unifaces and all basal fragments showing a hafting modification.

Hoe - All chipped stone tools exhibiting a high glossy polish on the surface near one or both ends.

Retouched Flake (bifacial) - Flakes possessing secondary modification including both thinning and edge retouch.

Biface other - In the absence of edge retouch, any tool exhibiting flake scars on both surfaces.

Uniface - Artifact flaked on one surface and not otherwise classified.

Retouched Flake (unifacial) - Flakes possessing secondary modification including both thinning and edge retouch.

PERFORATORS

Drill - Pronounced roughly parallel sided projection, length at least 1/3 total length of artifact, bifacial edge retouch on projection. Hafting element may be present. Fragments and tips meeting at least one of these criteria are included.

Graver - Broad, flat retouched projection. The projection is smaller than that for a drill. Probably unifacially worked. Retouch is localized.

GROUND STONE

Hammer (non-chert) - Any non-chert hardstone with a discrete area of battering or pecking not concentrated into a depression.

Mano - Flat stones exhibiting planar wear patterns (grinding or striations), possessing at least one flat to convex face. Must have at least one face showing no signs of these wear patterns. Worked face feels smoother and exhibits more polish than unworked face.

3/4 and Full Grooved Ax - Those celts on which a symmetrically beveled edge appears. The extent of the groove is 3/4, or full.

Abrader - Presence of groove and macrostriations and/or localized polish.

APPENDIX G

Scope of Work

CULTURAL RESOURCE SURVEY OF THE HARTWELL LEVEE AND DRAINAGE DISTRICT PROJECT AREA, GREENE COUNTY, ILLINOIS

SCOPE OF WORK

1. Statement of Work. The work to be accomplished by the Contractor consists of furnishing all labor, supplies, material, plant, equipment, if required, and all personnel necessary to perform a cultural resource survey and literature review of selected portions of the Hartwell Levee and Drainage District (Exhibit 1), Greene County, Illinois, and furnish a written report thereon, all as set forth in this Appendix A.

2. Location and Description of the Study Area. The study area is shown on Exhibit 2. The project area is situated between Illinois River miles 38.0 and 43.1L in Greene County, Illinois. Survey limits are outlined in red on Maps A, B, and C (Exhibit 2). The project universe includes the interior area adjacent to the existing levee and consists of 150-foot wide corridors (150 feet on the interior side of the levee), as well as selected areas designated on the exterior side, Maps A and C (Exhibit 2). The areas to be physically surveyed consist of 548 acres more or less of selected bottomland. None of the survey lands are Federally owned.

3. Study Plan.

3.1 General. The Contractor is responsible for the formulation, justification, and conduct of the study to include the design and execution of all survey methods and procedures as well as the presentation of the study results, unless otherwise set forth in this Appendix A, all to be included in a written report as set forth herein.

3.2 Definitions.

3.2.1 Literature Review. A literature review is a records searc designed to assimilate all available site specific data already on file with the state. This review should attempt to identify the location of all previously known archaeological or historic sites/structures within the survey universe. This review should include all site data collected and on file with the State Historic Preservation Officer. Detailed information regarding the length of occupation, cultural affiliation, and physical boundaries of each site (if known) should be included as an appendix to the written report. The literature review survey universe is outlined in red on Maps A, B, and C (Exhibit 2).

3.2.2 Cultural Resource Survey. A cultural resource survey is an intensive on-the-ground evaluation of an area sufficient to determine the number and extent of the resources present within that area. The cultural resource survey is to be conducted within the area marked in red on Maps A, B, and C (Exhibit 2). A random surface collection will be conducted on each site identified during this process. These collections will attempt to determine each site's temporal affiliation and horizontal surface distribution.

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archaeologist, must have a doctorate or an equivalent level of professional experience as evidenced by a publication record that demonstrates experience in field project formulation, execution, and technical monograph reporting. Suitable professional references may also be made available to obtain estimates regarding adequacy of prior work. If prior projects were of a sort not ordinarily resulting in a publishable report, a narrative should be included detailing the proposed project to director's previous experience, along with references suitable to obtain opinions regarding the adequacy of this earlier work.

3.2.4 Archaeologist. The minimum formal qualifications for individuals practicing archaeology as a profession are a B.A. or B.S. degree from an accredited college or university, followed by two years of graduate study with concentration in anthropology and specialization in archaeology during one of these programs, and at least two summer field schools, or their equivalent, under the supervision of archaeologists of recognized competence; a Master's thesis or its equivalent in research and publication is highly recommended, as is the Ph.D degree. Individuals lacking such formal qualifications may present evidence of a publication record and references from archaeologists who do meet these qualifications.

3.2.5 Consultants. Personnel hired or subcontracted for this special knowledge and expertise must carry academic and experiential qualifications in their own field of competence. Such qualifications are to be documented by means of vitae attachments to the proposal, or at a later time if the consultant has not been retained at the time of the proposal.

3.2.6 Institution or Contract Firm. Any institution, organization, etc., obtaining this contract, and sponsoring the principal investigator or

project director meeting the previously given requirements must also provide, or demonstrate access to, the following capabilities:

(1) Adequate field and laboratory equipment necessary to conduct whatever operations are defined in the scope of work.

(2) The institution will provide for storage and retrieval facilities for perpetual curation for all artifacts, specimens, records, and other documents of the cultural resource survey performed under this contract. The location of these materials will be stated in the report of this work and the Contractor will indicate how such materials and records can be made available to other professionals who may have a need for data deriving from the work conducted under this contract. All boxes containing artifacts collected during these activities will be marked PROPERTY OF U.S. GOVERNMENT, ST. LOUIS DISTRICT, CORPS OF ENGINEERS.

4. Publicity. The Contractor will not release any materials for publicity without the prior written approval of the Contracting Officer. This provision will not be construed so as to restrict in any way the Contractor's right to publish in scholarly or academic journals. Students and other archaeologists are likewise free to use information developed under this contract in theses and dissertations or in publications in scholarly or academic journals.

5. Permits. Rights-of-entry upon the work site for performance of work under this contract will be obtained by the Contractor. The Contractor will obtain the necessary approval to enter on any private property.

6. Inspection and Coordination. The Government may at all reasonable times inspect and evaluate the work being performed hereunder and the property on which it is being performed. If any inspection or evaluation is made by the

Government on the property of the Contractor or any subcontractor, the Contractor will provide and will require his subcontractor to provide all reasonable facilities and assistance for the safety and convenience of the Government representatives. All inspections and evaluations will be performed in such a manner as will not unduly delay the work. Close coordination will be maintained with the Contractor's principal investigator to insure that the Government's best interest is served.

7. Investigation of Field Conditions. Representatives of the Contractor are urged to visit the areas where work is being performed and by their own investigation satisfy themselves as to the existing conditions affecting the work to be done. Any prospective Contractors (including subcontractors) who choose not to visit the area will nevertheless be charged with knowledge of conditions which a reasonable inspection would have disclosed. The Contractor will assume all responsibility for deductions and conclusions as to the difficulties in performing the work under this contract.

8. Responsibility for Materials and Related Data. Except as otherwise provided in this contract, the Contractor will be responsible for all materials and related data covered by this contract until they are delivered to the Government at the designated delivery point and prior to acceptance by the Government. The designated delivery point is: Environmental Studies Section, 210 Tucker Blvd., North, Room 1138, St. Louis, Missouri, 63101.

9. Study Requirements.

9.1 Research Design. The Contractor will, working from a well prepared research design (that will be fully reported in writing as an appendix to the the final report), conduct a literature search and cultural resource survey in the study area as defined in paragraph 2 above. The research design shall

contain a statement indicating the location of the curation of all materials recovered by this contract work and their availability for the scholarly study.

9.2 Report Content. The Contractor will prepare a written draft and final report which describes in detail data collection techniques used, as well as an explanation of the rationale for their use. The draft and final report will consist of the complete background and literature search, as well as the detailed findings of the survey. A random surface collection will be conducted on each site identified during the pedestrian survey. These collections should attempt to determine each site's temporal affiliation and horizontal surface distribution. These report will include maps which accurately define site locations, areas surveyed, groundcover conditions, and sampling strata, as well as any other relevant data pertaining to this resource. A full set of reproducible copies of all maps, plates, and drawings will be included in Appendix A. Survey information such as groundcover, areas surveyed, and surface distributions should be clearly illustrated on appropriate USGS quadrangle maps, scale 1:24000. High quality hand lettering is acceptable; however, no color pen or pencil will be accepted. Only black ink or other black line methods will be used to prepare and to record data on base maps. Oversize maps will be folded and included in a pocket in the back of the appropriate section of the report or Appendix A thereof. Specific locations of sites found or otherwise identified as a result of investigations under this contract that might be subject to vandalism are to be submitted by the Contractor as a separate document, apart from but with the final report, and marked "Not for Submission to NTIS."

9.3 Other. The draft and final report will include a photographic log of each phase of work performed in this Appendix A. Thirty-five (35) millimeter slides are acceptable for this documentation. U.T.M. coordinates of each site identified will be presented as part of the overall site description. An abstract not to exceed one typewritten page shall also be included. Completed site forms (state or IAS) will be submitted for each site identified during these investigations.

9.4 Protection of Natural and Historic Features. The Contractor will be responsible for all damages to persons and property which occur in connection with the work and services under this contract without recourse against the Government. The Contractor will provide the maximum protection, take every reasonable means, and exercise care to prevent damage to existing historic structures, roads, utilities, and other public or private facilities. Special attention will be given to historic structures, natural and landscape features of the area, and special care will be taken to protect these elements in their surroundings.

10. Schedule of Work.

10.1 Draft Report. Five copies of the draft report will be submitted by the Contractor to the Government within 120 calendar days after the notice to proceed. The Government will review the report for compliance with the requirements of the contract and will return the draft report together with any written comments, which may require changes in the report, to the Contractor within 45 calendar days after its receipt.

10.2 Final Report. The Contractor will submit 20 copies of the final report, including the original copy signed by the principal investigator, within 195 calendar days (30 days after receipt of review comments) after receipt of the written notice to proceed. A set of reproducibles of all drawings, plates, and other graphics, including site forms, will be furnished at the time of submission of the final report.

11. Delays. In the event these schedules are exceeded due to causes beyond the control and without the fault or negligence of the Contractor, the contract will be modified in writing, and the contract completion date will be extended one calendar day for each calendar day of delay.

3 Incl
1. Exhibit 1
2. Exhibit 2
3. Exhibit 3, SLD Report Format

CULTURAL RESOURCE SURVEY OF THE NUTWOOD LEVEE AND DRAINAGE DISTRICT PROJECT AREA, JERSEY AND GREENE COUNTIES, ILLINOIS

SCOPE OF WORK

1. Statement of Work. The work to be accomplished by the Contractor consists of furnishing all labor, supplies, material, plant, equipment, if required, and all personnel necessary to perform a cultural resource survey and literature review of selected portions of the Nutwood Levee and Drainage District (Exhibit 1), Jersey and Greene Counties, Illinois, and furnish a written report hereon, all as set forth in this Appendix A.

2. Location and Description of the Study Area. The study area is shown on Exhibit 2. The project area is situated between Illinois River miles 15 and 23.5 on the east side of the river in Jersey and Greene Counties, Illinois. Survey limits are outlined in red on Maps A, B, and C (Exhibit 2). The project universe includes the interior area adjacent to the existing levee and consists of 150-foot wide corridors (150 feet on the interior side of the levee), as well as selected areas designated on the exterior side, Maps A and C (Exhibit 2). The areas to be physically surveyed consist of 375 acres more or less of selected bottomland. None of the survey lands are federally owned.

3. Study Plan.

3.1 General. The Contractor is responsible for the formulation, justification and conduct of the study to include the design and execution of all survey methods and procedures as well as the presentation of the study

results, unless otherwise set forth in this Appendix A, all to be included in a written report as set forth herein.

3.2 Definitions.

3.2.1 Literature Review. A literature review is a records search designed to assimilate all available site specific data already on file with the state. This review should attemp to identify the location of all previously known archaeological or historic sites/structures within the survey universe. This review should include all site data collected and on file with the State Historic Preservation Officer. Detailed information regarding the length of occupation, cultural affiliation, and physical boundaries of each site (if known) should be included as an appendix to the written report. The literature review survey universe is outlined in red on Maps A, B and C (Exhibit 2).

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3 Incl

1. Exhibit 1
2. Exhibit 2
3. Exhibit 3 SLD Report Format

APPENDIX H

Artifact Plates

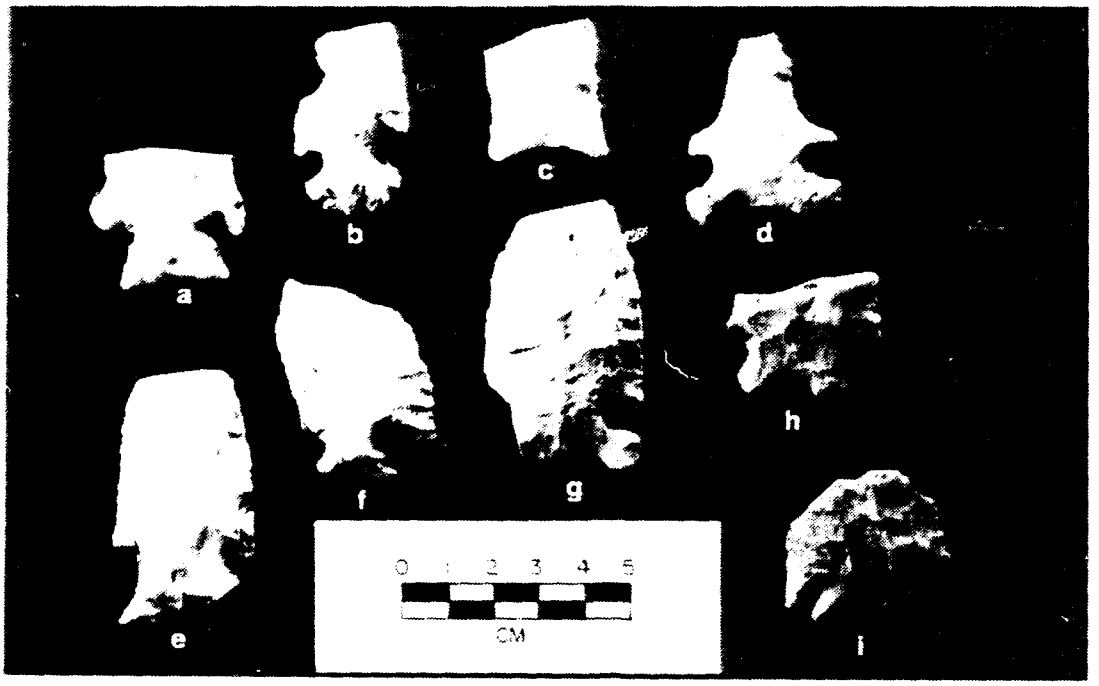

Plate 1

Early Archaic
St. Charles Corner Notched: (b,g) Burline Sandridge
Beaver Lake: (c) Bullseye
Graham Cave: (d) Quasar
McCorkle: (h) Burline Sandridge
Newberg: (i) Burline

Middle Archaic
Hardin Barbed: (a,e,f) Burline Sandridge

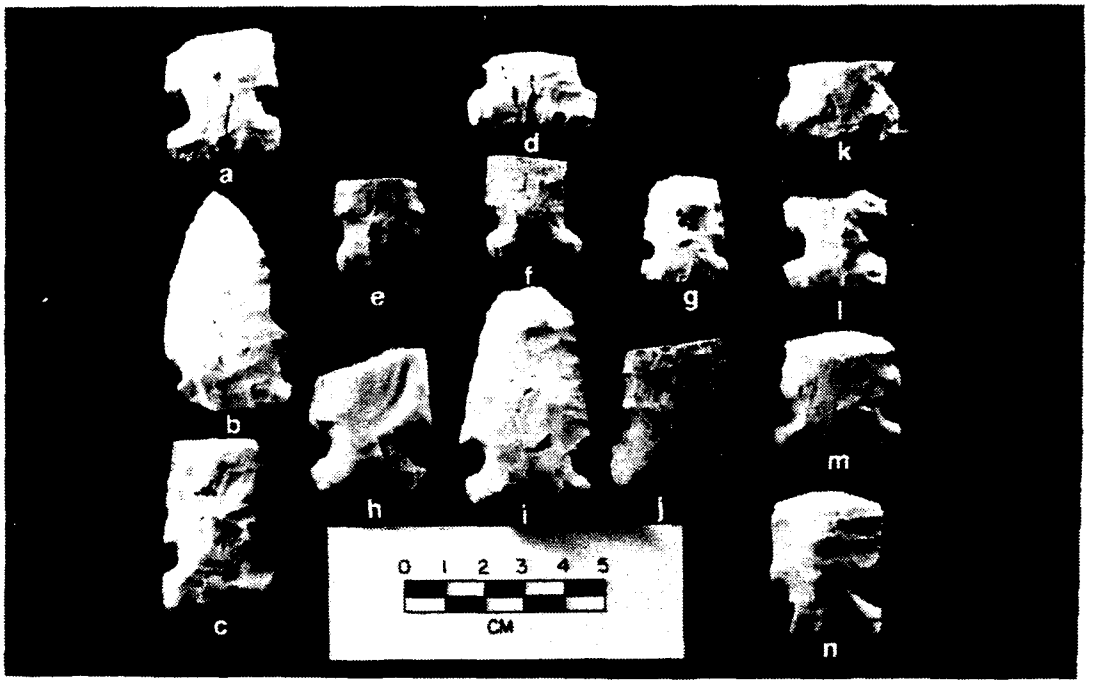

Plate 2

Middle Archaic

Godar: (a) Bullseye; (b) Narrow Sandy; (c) Britten
(d-n) Burline Sandridge

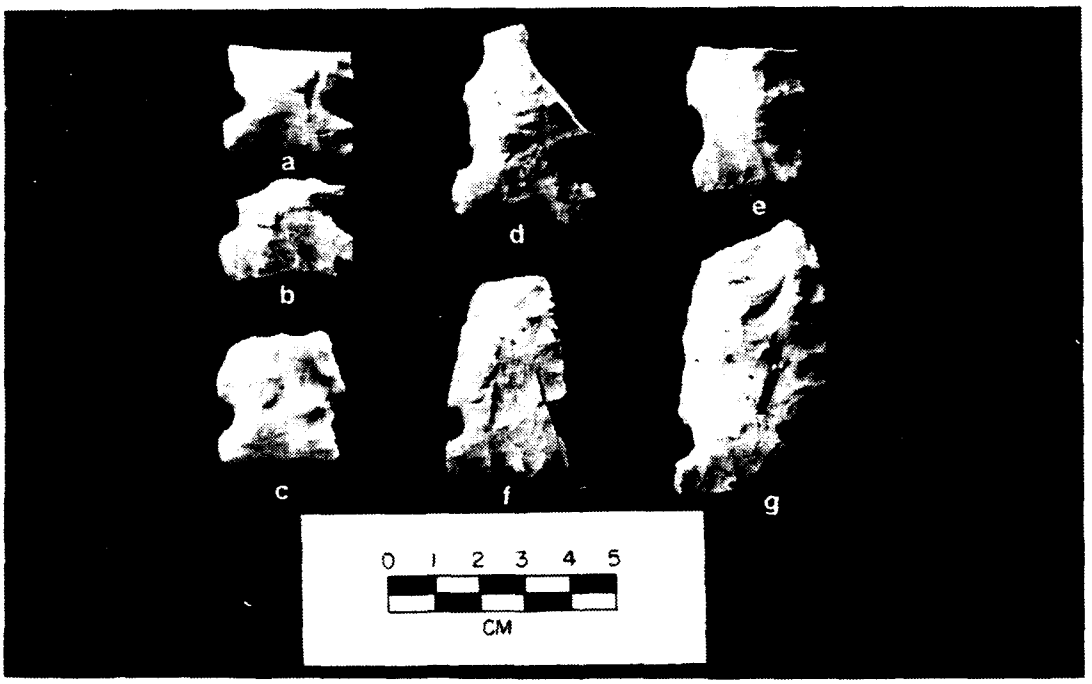

Plate 3

Middle Archaic
Side Notched: (a,d) Hurricane Creek; (b,c) Burline Sandridge;
(e) Howard; (f) Britten; (g) Bullseye

Plate 4

Middle Archaic
Cane Shaped Notch: (a) Howard; (b,c) Burline Sandridge
Helton Expanding Stem: (d) South End Shell
Osceola Side Notched: (e) Quasar
Table Rock Stemmed: (f) Burline Sandridge
Flare Stem: (g) Burline Sandridge
Calf Creek: (h,i) Quasar

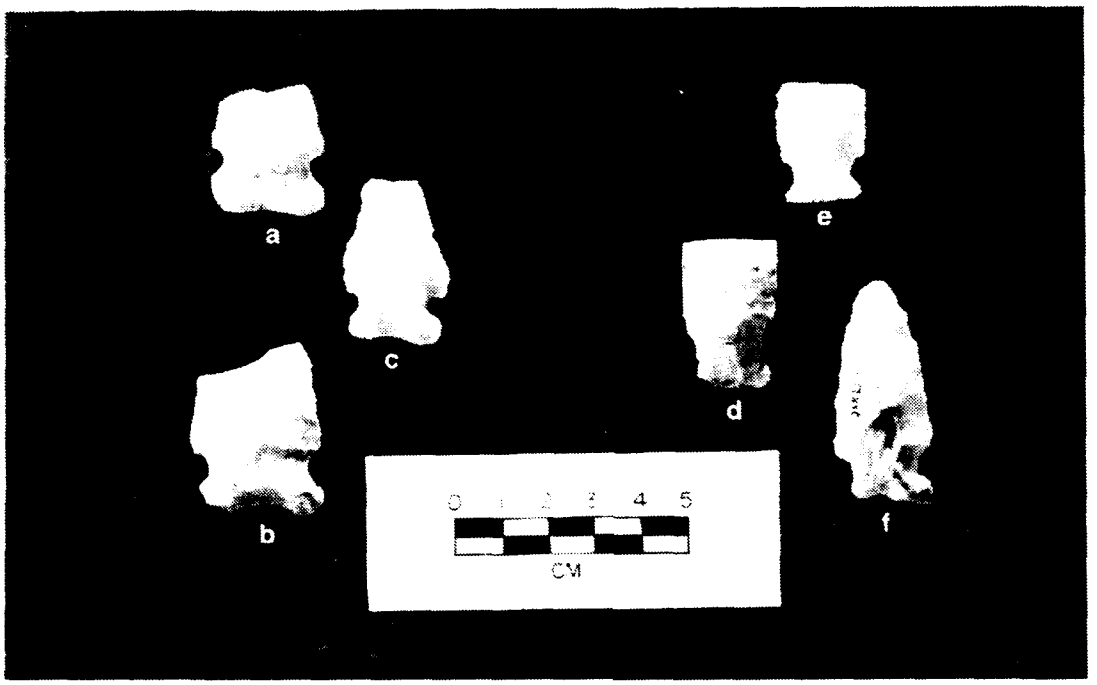

Plate 5

Middle Archaic
Shallow Side Notched: (a-c) Burline Sandridge
Matanza Side Notched: (d,e) Burline Sandridge; (f) Quasar

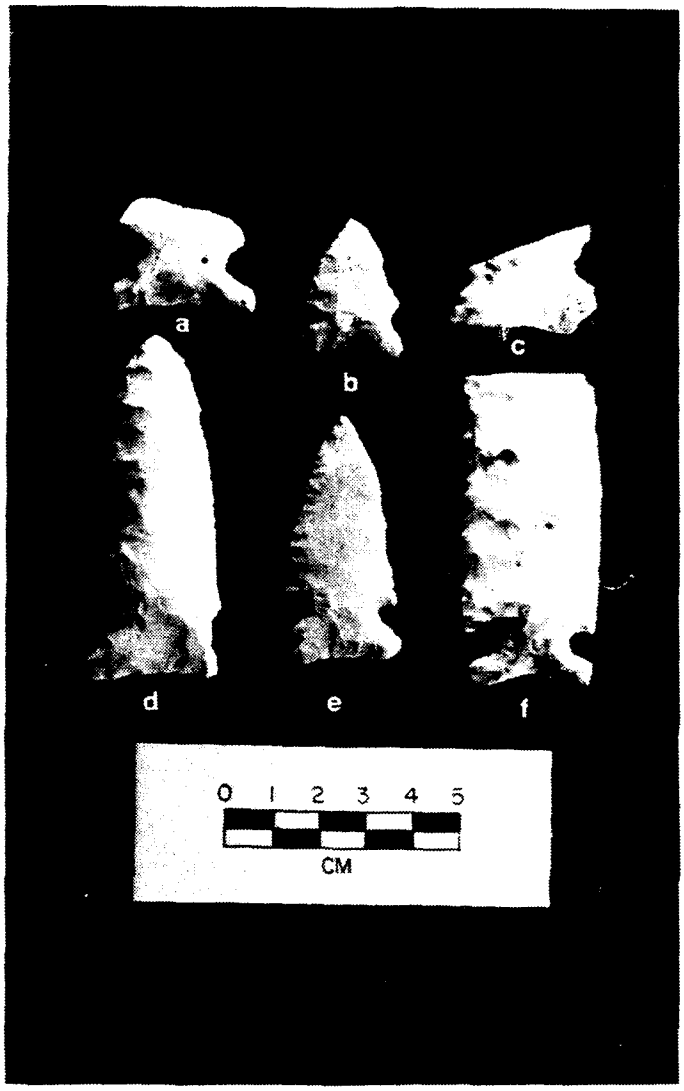

Plate 6

Middle Archaic

Unnamed Side Notched Concave Base: (a) Hurricane Creek; (b) Bullseye; (c) Burline Sandridge; (d) Silver Towers; (e) Narrow Sandy; (f) Quasar

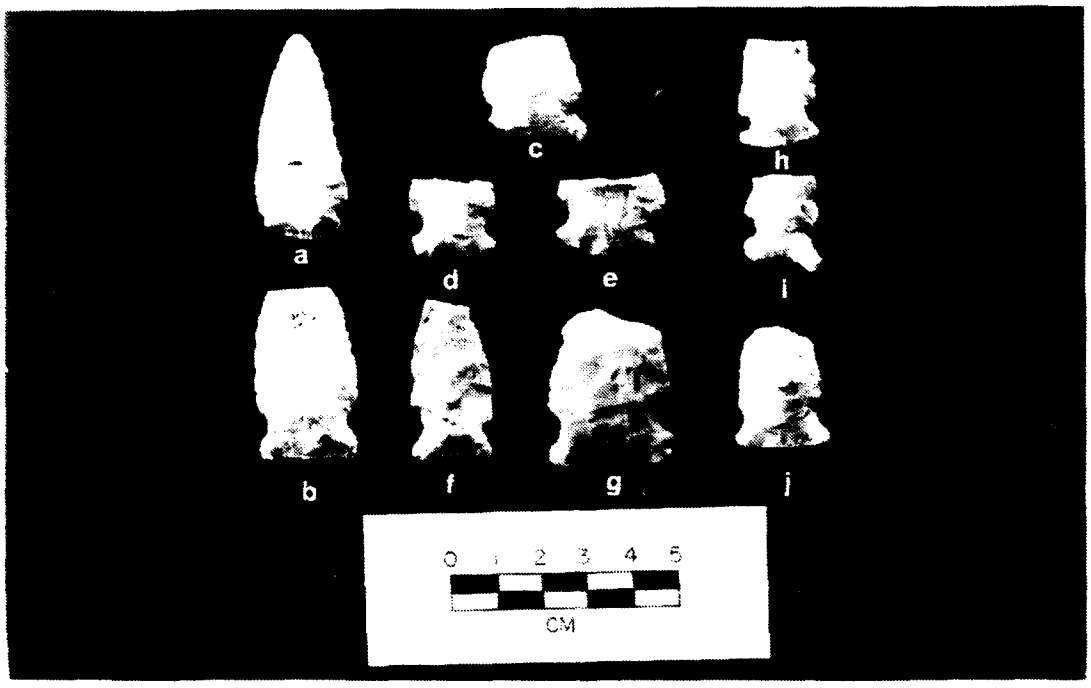

Plate 7

Middle Archaic
Unnamed Side Notched: (a) Bullseye; (b) Britten; (c-e) Burline; (f-j) Burline Sandridge

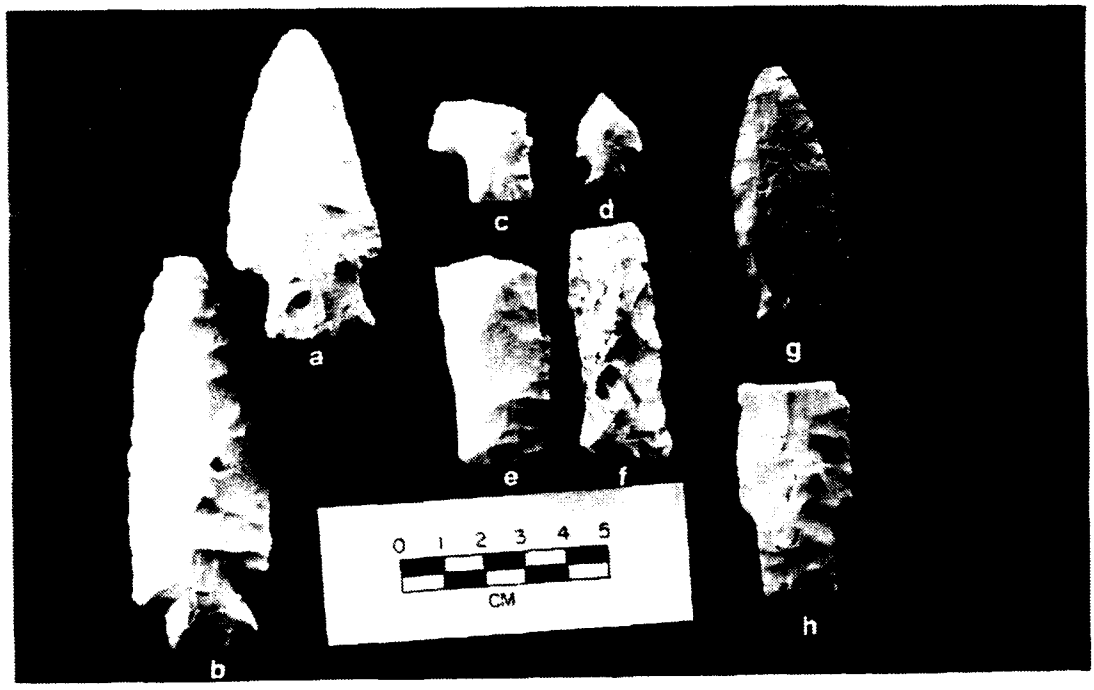

Plate 8

Late Archaic
Titterington: (a) Devening; (b,c) Burline Sandridge
Merom Expanding Stem: (d) Howard
Sedalia Lanceolate: (e) Wild Onion
Type Indeterminate: (f) Burline Sandridge
Kramer Stemmed: (g) Burline; (h) Burline Sandridge

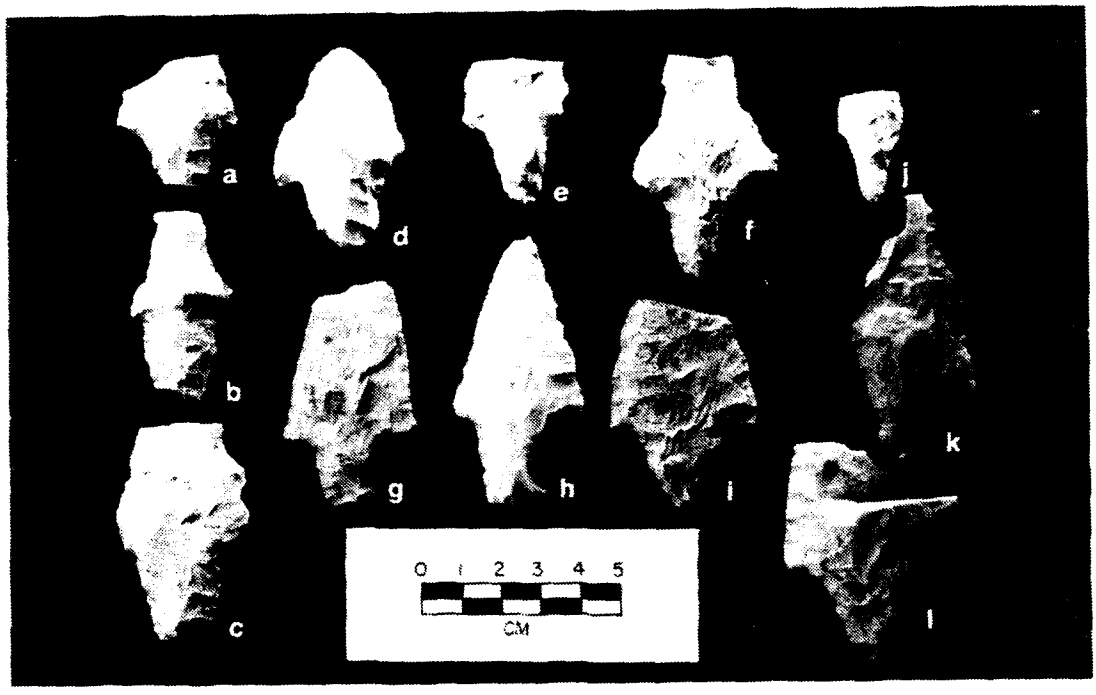

Plate 9

Early Woodland
Belknap: (a-c) Burline Sandridge; (d,e) Wild Onion; (f,g) Burline Sandridge; (h) Flat top; (i-l) Burline Sandridge

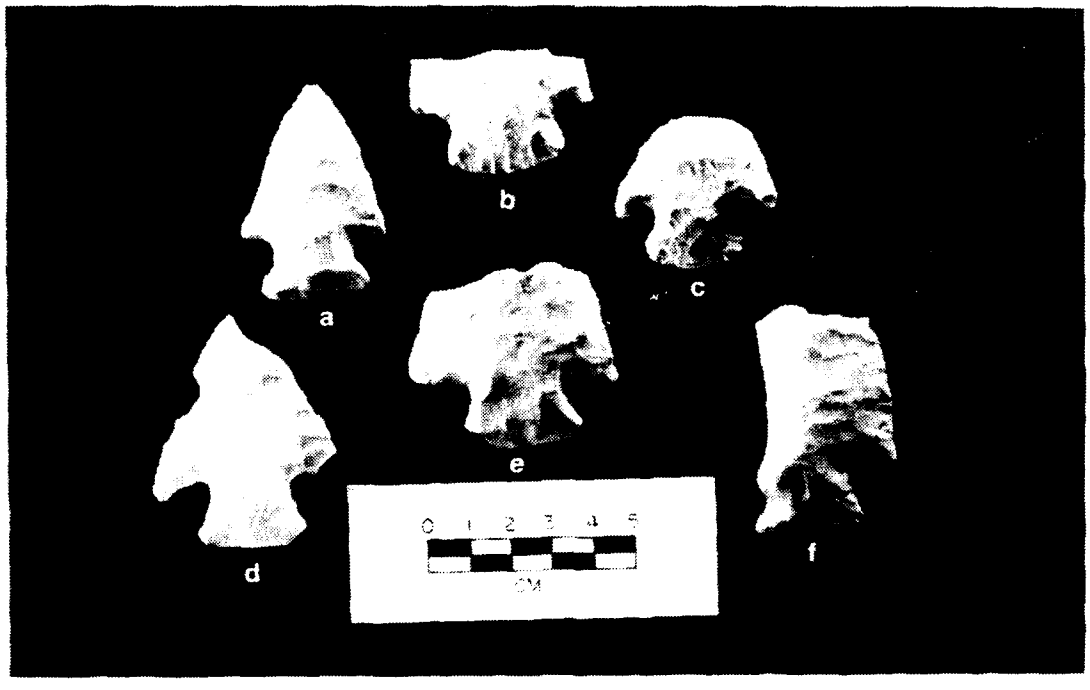

Plate 10

Middle Woodland
Synder's Corner Notch: (a) Quasar; (b,f) Burline Sandridge; (c) Hurricane Creek; (d,e) Wild Onion

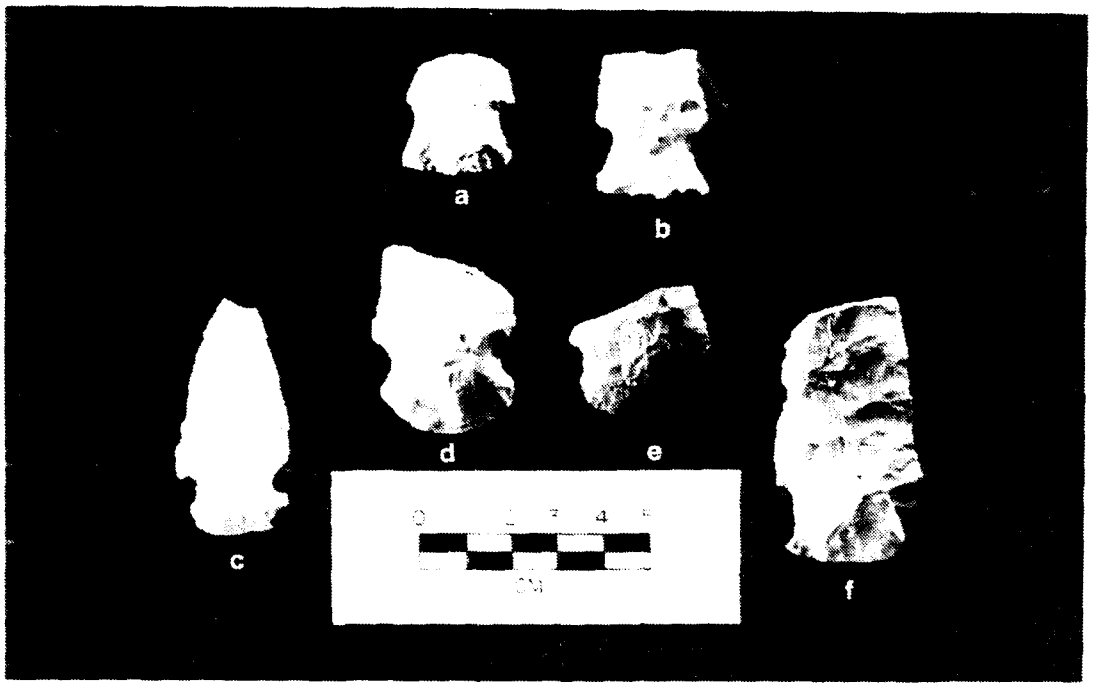

Plate 11

Middle Woodland
Steuben Expanding Stem: (a,b) Burline Sandridge

Woodland
Type Indeterminate: (c) Half Circle; (d,e) Burline Sandridge; (f) F.S. Field

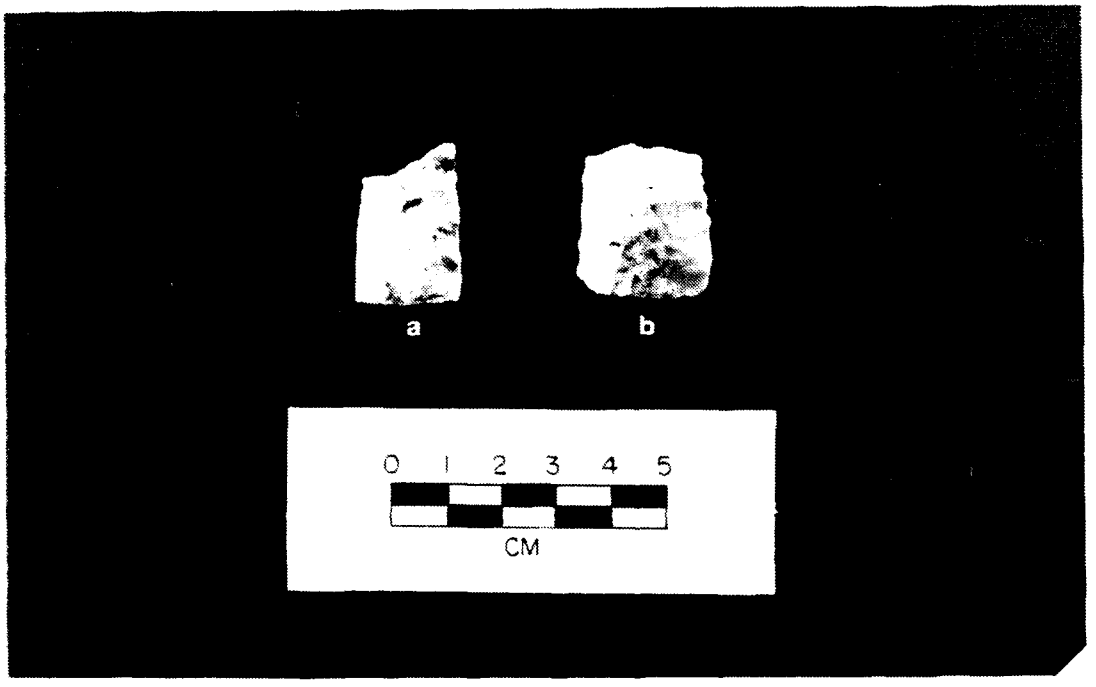

Plate 12

Mississippian
Madison Triangle: (a,b) Burline Sandridge

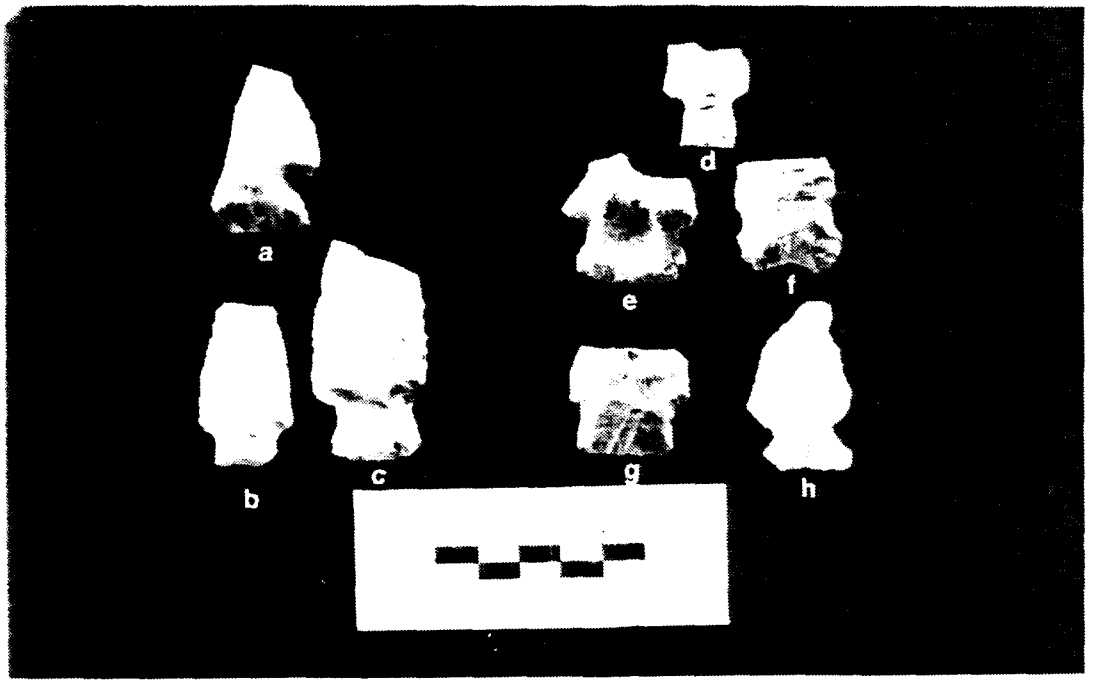

Plate 13

Type Indeterminate
(a) Britten; (b-h) Burline Sandridge

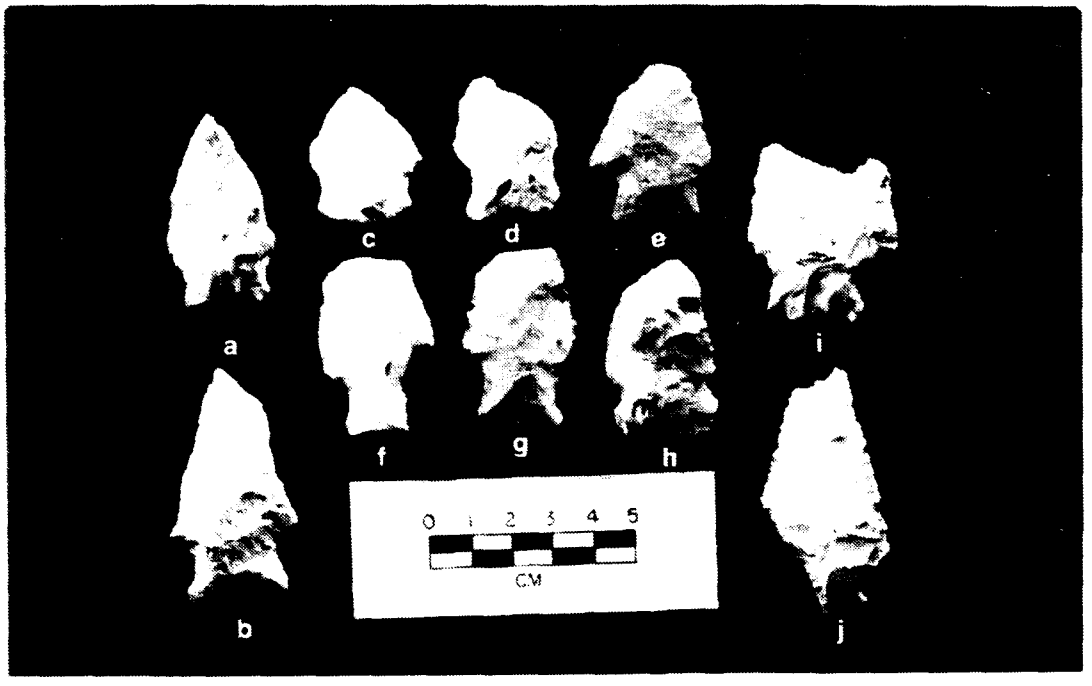

Plate 14

Type Indeterminate
(a) Burline; (b,e) Howard; (c,d,f-j) Burline Sandridge

Plate 15

Type Indeterminate
(a,b,d-i) Burline Sandridge; (c) Burline

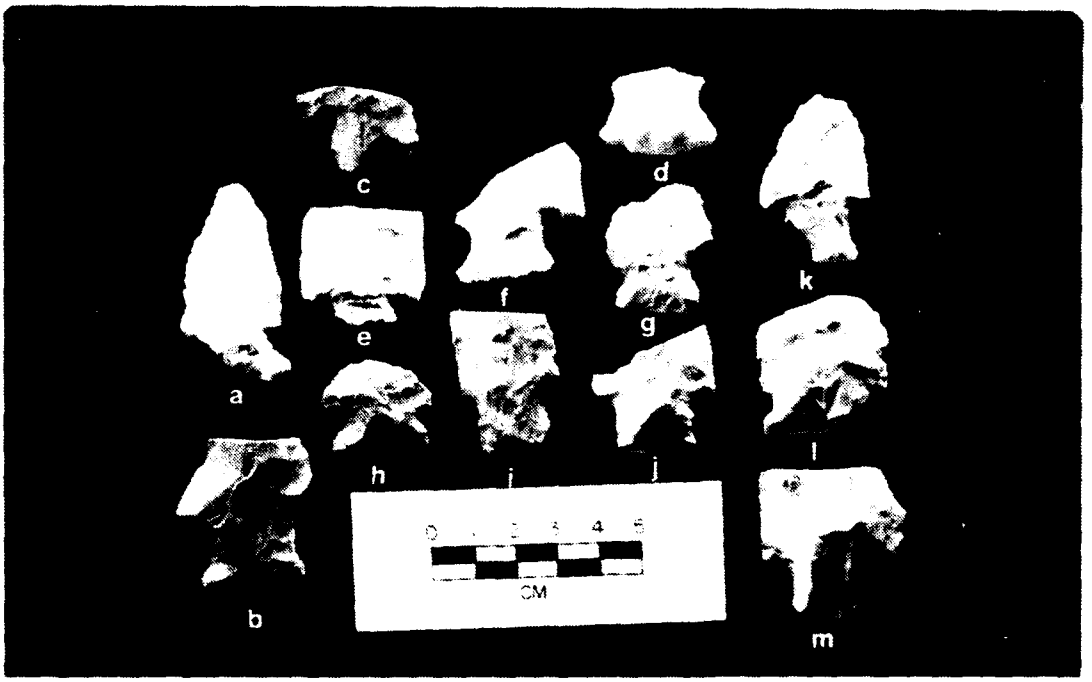

Plate 16

Type Indeterminate
(a,b,d,f-m) Burline Sandridge; (c) Burline; (e) Howard

Plate 17

Type Indeterminate
(a-c) Quasar; (d) F.S. Field; (e-q) Wild Onion

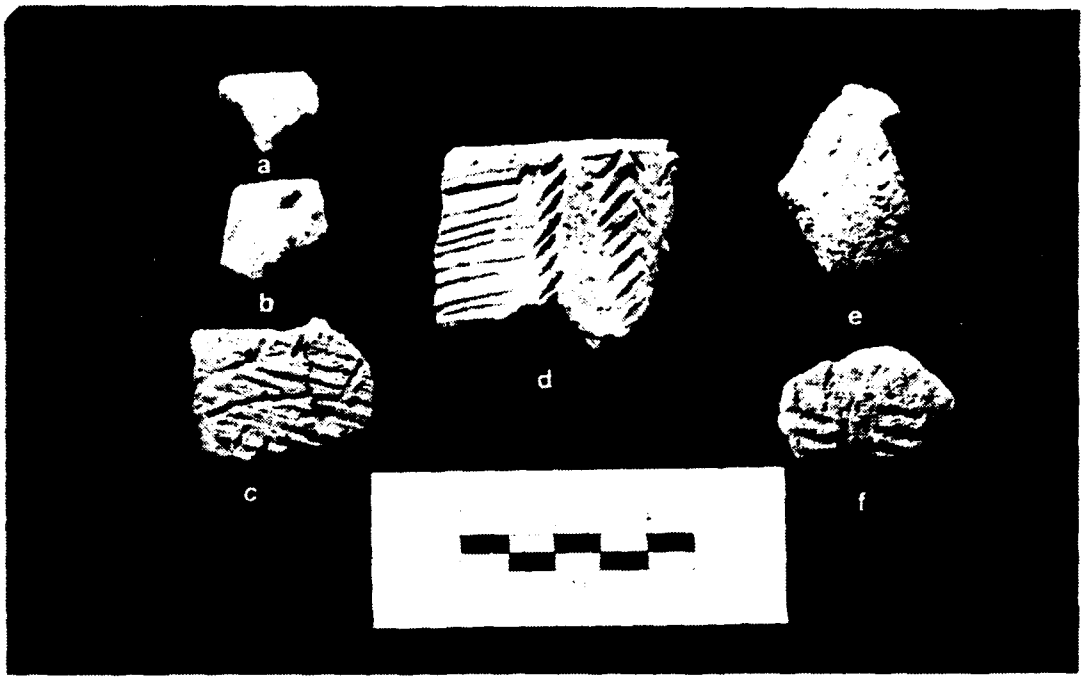

Plate 18

Type Indeterminate
(a,b) Bullseye

Early Woodland
Liverpool Series-punctate: (c,f) Bullseye
Black Sand Incised: (d) Bullseye
Fabric Impressed or Cordmarked: (e) Bullseye

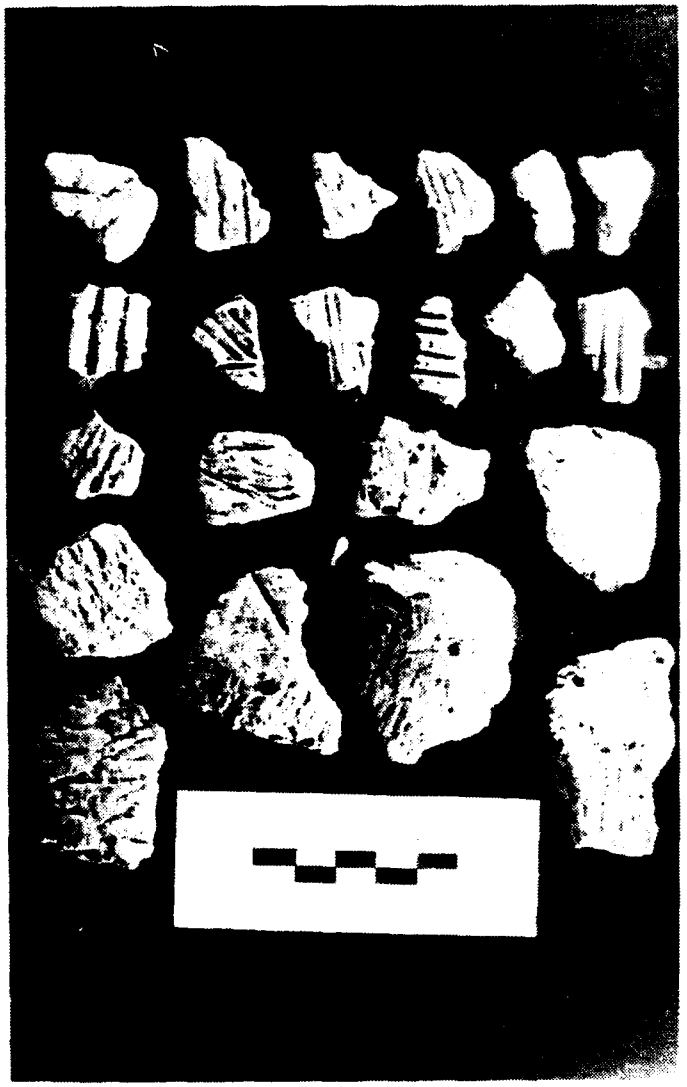

Plate 19

Early Woodland Black Sand Incised: Bullseye

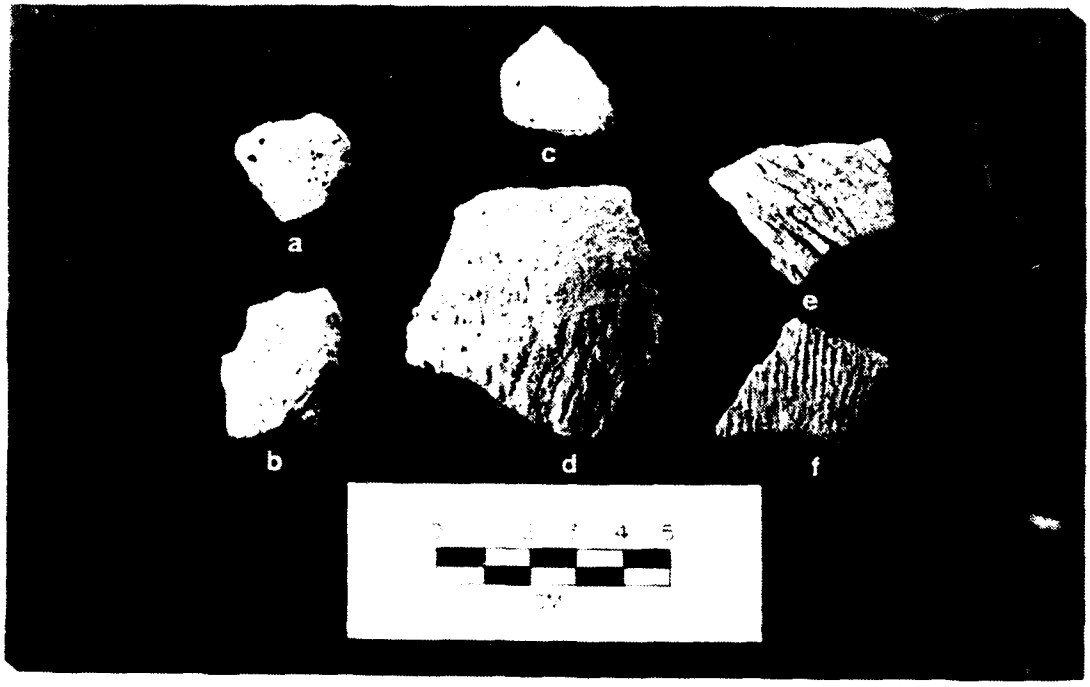

Plate 20

Type Indeterminate: (a,e) Quasar
Middle Woodland, Hopewell/Pike-Baehr: (b) Quasar
Late Woodland: (c) Quasar
Early Woodland-Liverpool Ware: (d) Quasar
Late Late Woodland: (f) Quasar

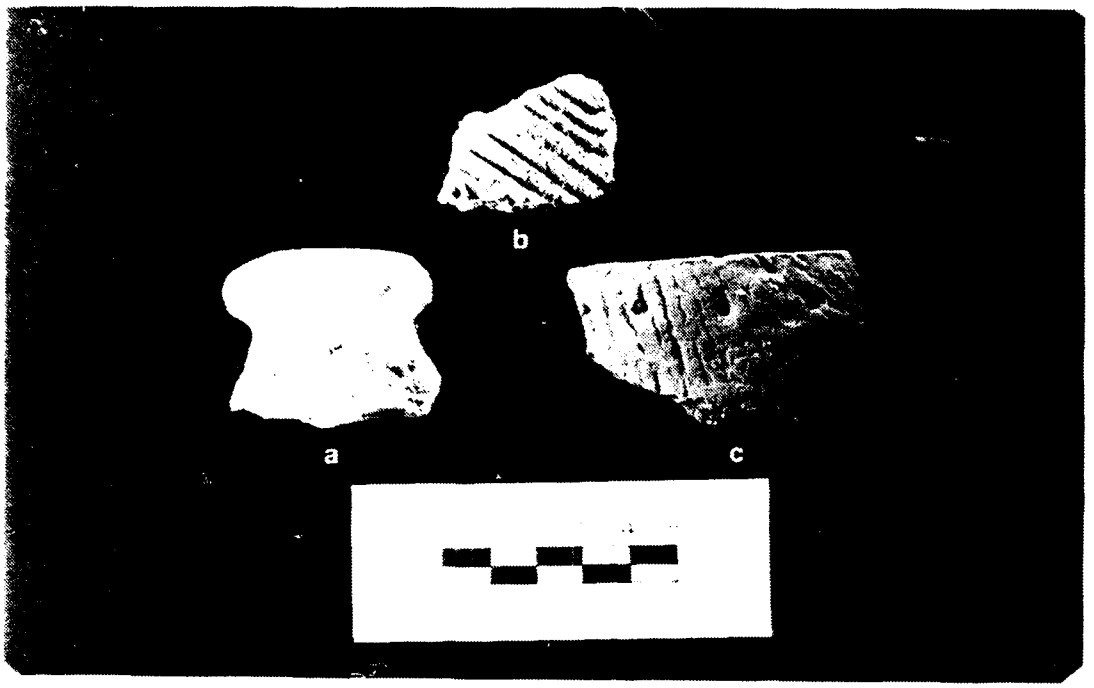

Plate 21
Late Woodland or Mississippian: (a) Burline Sandridge
Early Woodland
Black Sand Incised: (b) Burline Sandridge
Late Woodland-White Hall: (c) Burline Sandridge

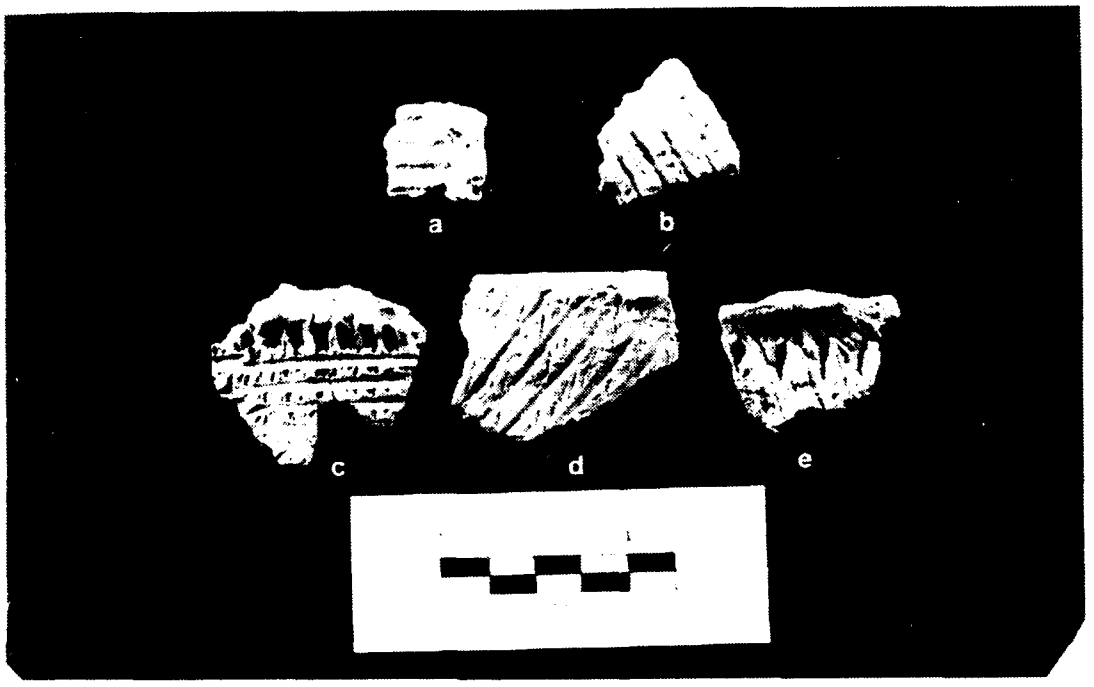

Plate 22
Early Woodland
Black Sand Incised: (a,b) Silver Tower; (d) Sunday
Liverpool Series: (c) Sunday
Peisker Pinched Punctate: (e) Sunday